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ABSTRACT

A multiple-method study of junior high school teachers' beliefs and classroom behavior focused on teachers' perceptions of teaching tasks and processes, on how their beliefs and behavior are shaped, and on constraints by outside influences. These influences, which make up the context of teaching, include organizational and community influences on teaching, constraints arising from the nature of the students being taught, and constraints originating in the task structures of the classroom organization. Data for the study were gathered during the 1982-83 and 1983-84 school years. Eight teachers in 3 schools were observed, videotaped, and extensively interviewed over a 12 week period. The conceptual framework, design, methodology, and analysis scheme for the study are described. Extensive reviews of research on teachers' beliefs, attributional processes, and decision-making strategies, as well as reviews of research on contextual influences on teachers' actions in the clasroom, are included. Various methodological approaches to the study of teacher beliefs are reviewed, and rationales for the selection of study methodologies are provided. (JD)

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The Teacher Beliefs Study:

An Interim Report

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An Interim Report

R & D Report No. 8020

Research and Development Center for Teacher Education

The University of Texas at Austin

February 1984

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SUMMARY . . . . . Criss Cloudt McCuller & Jan Nespor

ABSTRACT

This report describes the design of the Teacher Beliefs Study (TBS), The Research and Development Center for Teacher Education. The report is in four parts. The first describes the focus of the study. In the second part, current knowledge about the focal issues is summarized and critically analyzed. The third part of the report draws upon relevant literature and the preceding discussion to evaluate various methodological strategies for pursuing these issues, and the actual practices of the project are described and evaluated. Implications of the discussion for data analysis are presented in the fourth part of the report.

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INTRODUCTION

THE FOCUS OF THE RESEARCH

This document is an interim report on the Teacher Beliefs Study (TBS), an investigation of teachers' "subjectively reasonable beliefs" (Fenstermacher, 1978) about their roles as teachers, about their students, and about their schools and classrooms as work environments. This report reviews relevant bodies of literature, and describes the design and methodology of the study.

In the past decade research on the thought processes of teachers (see reviews by Clark & Peterson, in press; Shavelson & Stern, 1981) has produced a substantial body of knowledge about the ways in which teachers think, and what they think about in the course of teaching. While building on this work, the Teacher Beliefs Study differs from most past research in two ways. First, the study focuses on the ways teachers themselves conceptualize the tasks and processes of teaching. This emphasis stems from two basic assumptions. First, it is assumed that teachers actions are guided by or rationalized on the basis of theories, models, or beliefs about what does or should constitute teaching. This assumption is shared by many researchers, but is less often coupled with a second consideration, namely, that these explicit theories of teaching, products of experience and accomodation to the practical problems of the classroom, act as strong inertial forces which must be well understood if programs of reform or change in teaching practice are to be effectively implemented.

A second characteristic distinguishing the TBS from most other investigations of teacher thinking is its emphasis on studying the contexts of teaching, and teachers' perceptions of and accomodations to contextual influences. Context is understood in a broad sense to include organizational and community influences on teaching, constraints arising from the nature of the students being taught, and constraints originating in the task structures of classroom organization. Teachers' beliefs and theories about teaching are

not treated as givens, but are instead considered as products of teachers' on-going attempts to maintain subjectively coherent accounts of their own actions and the actions of those they deal with in the midst of emergent and ambiguous social situations. By focusing on the question of how teachers' beliefs are shaped and constrained by outside influences, it is hoped that knowledge may be gained of more effective ways of directing and intervening in this process.

There are two distinct ways in which research on teachers' beliefs may contribute to the improvement of teacher education. First, teacher thinking research may provide valuable information about what teachers need to know in order to perform effectively in classrooms. Teaching is not merely a matter of behaving in a certain fashion, but of selectively processing information about the flow of classroom activities, making "in-flight" decisions, and recursively monitoring and evaluating one's own performance. Teaching is, in short, a complex set of tasks requiring elaborate attention-focusing strategies, specialized knowledge structures ("classroom schemata"), and well-developed decision-making skills. Research on teacher thinking, by identifying these strategies, skills, and knowledge structures, can make a contribution to the content of teacher education.

A second way in which research on teachers' thoughts and beliefs may inform teacher education is by providing insight into the reasons that teachers give for their practice. Fenstermacher's (1979) discussion of an "intentionalist" approach to teacher education provides some of the underpinning for this line of research. Fenstermacher (1979) argues that there is "a critical difference between studying what makes teachers effective and teaching teachers to be effective" (p. 175). To teach teachers requires that researchers turn their attention to the "subjectively reasonable beliefs" that teachers use to make sense of their practice. By identifying these

beliefs, researchers can learn something about why teachers act as they do, and also about the kinds of arguments that might be effective in altering or influencing these beliefs.

The Teacher Beliefs Study has intensively investigated the beliefs and actions of a small sample of teachers in a variety of school contexts. Eight teachers -- two each in the subject matter areas of 8th grade English, 8th grade mathematics, 8th grade American History, and 7th grade Texas History -- were observed and videotaped, usually once a week, for approximately twelve weeks. Narrative descriptions of the classrooms were constructed, using the videotapes to insure comprehensiveness and to provide ver batim accounts of classroom discourse. The video tapes were also used to conduct four "stimulated recall" interviews with each teacher. In these interviews the teachers were asked to view the tapes of their classrooms and to explain their goals, thoughts, or decisions at particular points in the class session. Four extensive, relatively unstructured Repertory Grid interviews were also conducted with each teacher. These interviews focused on the teachers' backgrounds and general views and beliefs about teaching, on their perceptions of the students in the classes observed, on their views about the nature and sources of discipline problems, and on the administrative and community influences that they felt affected their classroom practice. All of these methods, and the reasons for their selection, are discussed in this report.

In an effort to gain a better understanding of the possible influences of school context on teachers' beliefs and practices, teachers in three contrasting school settings were studied. One school was the sole junior high in a small rural community, in a resource-poor school district. Teacher turnover was high and the teachers were not organized. A second school was one of ten junior highs in a resource-rich urban district, with a relatively stable and organized teacher population. Due to court-ordered desegregation policies

in the district, this school served three geographically dispersed segments of the community. A third school occupied an intermediate position between the other two schools: located on the outskirts of an urban center, it drew students from both rural and urban areas. The school district, however, corresponded to no cultural or political entity which would normally be considered a "community." The teaching staff at the school was relatively stable, but few of the teachers at the school lived in the areas served by the school. The district itself was small (the junior high studied was the only one in the district) and relatively resource-poor, but because of its proximity to the urban area was able to draw on resources from the city (such as a Regional Service Center and a campus of the state university) much more easily than the rural school.

Consistent with the aims of the Teacher Beliefs Study, the reviews of research focus on two general areas: teacher beliefs themselves, and the contexts of teaching with may influence these beliefs.

REVIEW OF THE LITERATURE

PART 1: TEACHER BELIEFS

The bulk of the research on teacher thinking has focused on teachers' interactive decision making and planning, with relatively few studies specifically addressing teachers' beliefs. However, as Clark & Peterson (in press) point out, the investigation of teachers' beliefs may be central to a complete and useful understanding of thought processes in teaching:

> While we may learn much that is interesting and useful from a technical point of view from research on planning, interactive thinking, and teachers' attributions, we can make sense of these findings only in relation to the psychological context in which the teacher plans and decides. (p. 90)

The "psychological context" referred to above consists of the beliefs, values, and principles a teacher has concerning the role of a teacher and how teaching and learning occur.

This section will summarize studies which focused on teacher beliefs and the factors which seemed to influence those beliefs. A variety of methods were used in these studies including: stimulated recall interviews, repertory grid interviews, participant observation, clinical interviews, and q-sorts (some of these techniques are discussed in this report's section on methodology). The studies also employed a variety of terms and concepts to characterize teacher beliefs, including "implicit theories" (Olson, 1980, 1981), "construct systems" (Bussis, Chittenden, & Amarel, 1976), "practical knowledge" (Elbaz, 1981, 1983), "classroom perspective" (Janesick, 1977, 1978), and "principles of teaching" (Conners, 1978; Marland, 1977). These terms reflect the use of different conceptual orientations, making comparison and aggregation of the studies difficult. The discussion of research on teacher beliefs that follows focuses on three areas of research. First, conceptual frameworks for analyzing the "structure" of teacher beliefs are reviewed. Second, the substantive areas identified by researchers as the foci

of teachers' beliefs are examined. The third, and much more extensive area to be reviewed focuses on the "content" of teachers' beliefs. This includes research on specific content areas such as teachers' views of students or subject matter.

The Structure of Teacher Beliefs

Several researchers have noted that "beliefs" are differentiated in a number of ways: a) in terms of whether they are closely tied to particular situations or relevant to a wide range of situations; b) in terms of whether or not they are tied to specific courses of action; c) in terms of whether they represent knowledge of things or knowledge about how to do things; and d) in terms of whether the reference of the beliefs is internal -- knowledge of the actor's own needs, intentions, plans or state of mind; or whether the reference is external -- the actor's knowledge of his or her environment. These issues can be seen as focusing on the structure of teacher beliefs. This section reviews teacher thinking research which has explicitly considered such questions.

Elbaz (1981; 1983) in one of the more elaborate discussions of the structure of teacher beliefs, posited three forms of what she called the teacher's "practical knowledge." She labeled these forms "rules of practice," "practical principles," and "images." Rules of practice are defined as brief statements prescribing what to do or how to do something in particular situations frequently encountered by the teacher. These rules may be highly specific or quite general. In either case, the rules make reference to the details of the situations to which they are related -- to the appropriate way of carrying out actions in those situations (the purposes or reasons for the action are taken for granted and left implicit). Examples of rules of

practice would include such teacher statements as "don't judge," "give a variety of activities," or "listen actively to student comments."

"Practical principles" are more inclusive and less explicit formulations, less closely linked to specific situations. In contrast to rules of practice, principles of practice make specific reference to the teacher's purposes, aims, or reasons for the action being undertaken. An example of a practical principle would be a teacher's statement that "it is important to provide a variety of activities to first graders because their attention spans are so short."

"Images" are the least explicit and most inclusive of Elbaz's three forms of practical knowledge. Images take the form of brief metaphoric statements or analogies concerning how good teaching should look and feel. "On this level, the teacher's feelings, values, needs and beliefs combine as she forms images of how teaching should be, and marshals experience, theoretical knowledge, school folklore, to give substance to these images" (Elbaz, 1981, p. 134). Images are produced intuitively rather than analytically and are usually imbued with a judgement of value. For example, a teacher may hold an image of herself as "a good, energetic teacher" or a teacher may characterize her relationship with her students as "an ally, working together to allow them to beat whatever system is outside."

Elbaz's three levels of structure thus move from rules closely tied to specific contexts, to more context independent "principles" clearly linked to goals, to "images" which provide frames enabling the teacher to conceptualize his or her roles and actions.

Other researchers, using different methods and different terminologies, have analyzed teacher beliefs in ways that suggest certain analogs to the structural levels posited by Elbaz. Janesick (1977; 1978), for example, while not speaking explicitly of structural levels of knowledge or beliefs,

described a teacher's "classroom perspective" as being comprised of "elements" and "assumptions" similar to Elbaz's "rules" and "principles" respectively.

More explicit attention to the structure of teachers' knowledge is found in the works of Marland (1977) and Conners (1978), both of whom based their frameworks on stimulated recall interviews with groups of elementary school teachers.

Marland (1977) identified four structural components of teachers' knowledge, which he labeled "beliefs," "principles," "rules," and "case histories." These are defined as follows:

> Beliefs are reflected in statements by teachers about characteristics of humans and human behavior, particularly those related to school children which they assume to be true. In some instances these beliefs may constitute part of the body of conventional wisdom in which principles may have their genesis.
>
> Principles are maxims, working hypotheses, or fundamental laws that a teacher consciously holds and which exercise a directing influence on his classroom behavior.
>
> Rules are guides for student conduct or action in the classroom. They may have been prescribed or suggested by the teacher, or jointly formulated by teacher and students.
>
> Case histories are mental inventories of facts, opinions, beliefs, attitudes expectations and such that teachers hold in respect to individual students.

Conners (1978) replicated and extended Marland's work (both studies were doctoral dissertations completed at The University of Alberta, Canada). Like Marland, Conners identified "principles," "beliefs," and rules" as different structures of teacher knowledge. However, these were discussed in much more detail and "case histories" were subsumed under a fourth category labeled "other factors." These four structures were defined as follows:

> Beliefs reflect the teacher's acceptance or conviction in the truth or actuality of something.
>
> Principles are maxims, working hypotheses, or fundamental laws that a teacher consciously holds and which exercise a directing influence on that person's classroom behavior.

Classroom Rules are organizational features of classroom life that control such matters as pupil movement around the room or the time allowed for the completion of homework. A rule operates to provide part of the supporting structure that contributes to the even flow of classroom life. When a rule is broken, the student is reminded of the rule and in most cases punished.

Other Factors: Besides beliefs, principles and rules, five other factors were seen as influencing teacher behavior in the classroom: teacher's role conceptions, idiosyncratic intrusions, objectives, information concerning pupils and expectations for pupils, and ecological influences.

While differences in the researchers' methods and theoretical orientations make comparison difficult, it can be suggested that what Marland and Conners referred to as "beliefs" correspond fairly closely to what Elbaz called "rules of practice," while their "principles" closely resemble what Elbaz labeled "principles of practice." However, where Elbaz's categories of teacher knowledge are self-referential -- the teacher's knowledge of what she does, why she does things and what her role as a teacher is or should be -- Marland and Conners introduced categories for the teacher's knowledge about other aspects of the schooling context: Specifically, knowledge about how students may behave in the classroom, conceptualizations of the students' identities both within and outside the classroom; knowledge about ecological factors that may affect classroom interaction, and so on. Marland's and Conners' discussion of the content of teachers' knowledge, as well as the discussions of other researchers who focus on content areas of teachers knowledge, are examined below.

The Focus of Teachers' Beliefs

As Fenstermacher (1978) persuasively argues, the identification of teachers' subjectively reasonable beliefs is an important preliminary step both to understanding teacher behavior and to understanding how to change that behavior. However, Fenstermacher does not provide much insight into how researchers are to uncover teacher beliefs. It is not so simple as merely

asking the teachers why they do what they do (Fenstermacher,1978, p. 178). (See also the verbal reports section of the methodology discussion.)

The kinds of things teachers describe themselves thinking about and the ways they describe these things may vary with the researchers' conceptual frameworks and methods. The studies reviewed below demonstrate this diversity, while at the same time providing useful categories and frameworks to inform TBS data analysis.

The Teacher as the Focus of Teacher Beliefs.

Through a series of open-ended interviews with a single high school English and reading teacher, Elbaz (1981; 1983) identified five content areas which were the focus of the teacher's practical knowledge: "subject matter," "curriculum," "instruction," "milieu," and "self." "Knowledge of self" referred to the teacher's personal values and purposes. This included the teacher's image of herself as teacher and professional, the way she viewed her place in the classroom and in the school, and the kinds of authority and responsibility she assumed. "Knowledge of the milieu" included information about the basic setting of the classroom, relations with other teachers and the administration, and the political context of teaching. "Subject matter knowledge" included the teacher's conceptions underlying different facets of content, the ways in which content from different subject matter areas was selected and combined, and how the content was changed as the teacher used it in teaching. "Knowledge of curriculum" referred to the teacher's experiences in curriculum development and the theoretical orientation underlying her approaches to curriculum development. "Knowledge of instruction" referred to the teacher's views on how instruction should be organized, how learning took place, the role of the student in the learning process, and the evaluation of the results of teaching.

Munby (1982b) described five content areas of teacher beliefs based on repertory grid interviews with fourteen junior high school teachers. These areas were labeled "goals," "management," "teacher needs," "student needs," and the "facilitation of learning." "Goals" included both academic and non-academic goals, and also referred to principles which appeared to arise from considerations of subject matter. "Management" included principles that spoke to time and behavior as well as those mentioning evaluation and student involvement. "Teacher needs" arose from personal preferences or values, such as a teacher's need for order or a teacher's need to put professional knowledge to use. "Student needs" referred to the teachers' views on the personal and academic characteristics of the students that should be promoted. The "facilitation of learning" was described as a repository for all the teachers' beliefs and principles that appeared to operate as "rallying points" for thinking about immediate instructional matters. Munby identified the content areas of goals and management as dominating the thinking of the teachers in his study.

While Elbaz (1981; 1983) supplemented her interviews by observing the teacher she studied for two class periods, her findings are based primarily -- and Munby's entirely -- on interviews outside the classroom context. Moreover, the interviews of these researchers, by design, were as nondirective as possible. Whether for these or other reasons the content areas on which the teachers' thoughts focused were self-referential -- stressing the importance of the teachers' own needs, values, views, and goals. In contrast, research using other methodological techniques suggest that teachers' thoughts may focus on very different concerns.

The Student as the Focus of Teacher Beliefs

Bussis, Chittenden, and Amarel (1976) identified three content areas of teacher beliefs through formal interviews with sixty elementary teachers:

"curriculum," "children," and the "working environment" of the school. The teachers' understanding of the curriculum referred to the variety of encounters teachers planned for children. It also referred to the organization of curriculum which consisted of the learning priorities and the concerns that teachers held for children. Understanding of children included the qualities that teachers ascribed to children as well as their assumptions regarding the relationship of these qualities to learning and instruction. The qualities that teachers ascribed to children were discussed in terms of teachers' perceptions of the emotional needs and feelings of students, student interests and choice, and teacher beliefs about social interaction among students. The working environment concerned the institutional resources that characterized the schools in which the teachers worked -- resources such as other teachers, aides and paraprofessionals, parents, the principal, institutional policies and procedures.

Using a very different methodological approach (ethnographic participant observation of a single teacher), Janesick (1977; 1978) identified focal concerns of teacher beliefs quite similar to those identified by Bussis et al. (1976). Janesick identified a number of "elements" on which teacher beliefs focused: the ideas of maintaining a strong sense of "groupness," focusing of respect and cooperation as major classroom goals, remaining the leader of the group, and displaying a style of teaching which reinforced the class goals of respect and cooperation. Janesick also identified three assumptions which reinforced the teacher's perspective on the importance of respect and cooperation:

1. The teacher maintained that the classroom ought to provide those things for students which were absent or minimal in their own homes (norms of respect and cooperation apropriate to working in groups);

2. The teacher saw the goals of respect and cooperation as having critical long-term consequences in the students' lives; and

3. The teacher viewed instructional goals in terms of the major class goals of respect and cooperation.

Finally, as in the Bussis, et al. study, Janesick noted that other actors in the school -- the principal, teacher aides, and intern teachers -- had a significant influence on the teacher's beliefs about students and instruction.

Thus, both Janesick and Bussis et al., in contrast to Elbaz and Munby, suggested that the major focus of teachers' thoughts are their students. Curricular and pedagogical concerns are also important, but only in terms of their relationship to student needs (however, as noted later in this section, the teachers studied by Bussis et al. differed sharply in the ways they conceptualized the needs and characteristics of their students).

There is no clear way to determine why the Janesick and Bussis et al. studies show teachers thinking about different things than Elbaz and Munby. Again, methodology may be the key. Janesick focused on the teachers' classroom actions and Bussis et al. geared their questions to the classroom setting, specifically asking about the teachers' views of students. Still other methodological approaches produce a different picture of the content of teachers' beliefs.

Beliefs Teachers Use to Explain Interactive Classroom Behavior

The studies reviewed above derived models of teachers' beliefs from interviews outside the classroom context (Janesick, 1977, also made long-term observations of her teacher's classroom). One significant characteristic of these models is their generality. They specify only broad areas about which teachers have beliefs. In contrast, another line of research has examined teachers' beliefs about specific instances of interaction in the teachers' classrooms. In particular, two studies (Conners, 1978; Marland, 1977) have

identified teachers' beliefs about their interactive teaching behavior. Both researchers refer to these beliefs as "principles".

Marland's (1977) principles were derived from stimulated recall interviews with six teachers; one each from first, third and sixth grades in three schools. Two stimulated recall interviews were conducted with each teacher using videotapes of lessons in language arts and mathematics for teachers in first and third grades and two lessons in language arts for sixth grade teachers. Marland identified five principles of teaching which seemed to exert a strong influence on the teacher's behavior or were mentioned by at least two of the six teachers studied. These principles included: compensation, strategic leniency, power sharing, progressive checking, and suppressing emotions.

Principle of Compensation. This principle represented an attempt by the teacher to compensate the "have-nots" for their alleged disadvantages. Teachers believed that they discriminated in favor of the shy, the low ability group, and the culturally impoverished. This principle was used by four of the six teachers studied but was more fully explicated and used more often by the first grade teachers.

Principle of Strategic Leniency. Marland regarded this principle as an extension of the Principle of Compensation. Teachers believed that they were consciously more lenient toward the children they regarded as needing special attention.

Principle of Power Sharing. This principle involved the teachers' uses of the informal power structure of peer influence in the classroom to manage student behavior. Teachers were seen as sharing their power to influence with certain students in the classroom by selectively reinforcing the good behavior of class leaders who were expected to influence their peers' behavior.

Principle of Progressive Checking. This principle involved the use of periodic checking by teachers in order to monitor student progress, identify problems and encourage the learning of low ability students. Teachers also thought that they were providing varied stimuli for students with low attention spans, considering this necessary for enhancing learning in these students.

Principle of Suppressing Emotions. All of the teachers studied reported consciously suppressing their emotions while teaching, usually when they were under duress. This principle appeared to be based on the teachers' belief that they served as an emotional catalyst; if the teacher became noisy, then the students would follow suit. Marland (1977) noted that this principle was often used as a management strategy. When the classroom became noisy teachers would assume calm and passive postures. The practice of suppressing emotions was also sometimes coupled with teachers' desires to protect students' self-concepts. This was often seen during classroom discussions where teachers would state a reluctance to tell a student that an answer was incorrect. This reluctance also appeared to stem from the teachers' desires to promote student participation and interest, elements which were seen as important to a successful lesson.

Like Marland (1977), Conners (1978) identified a number of principles that seemed to guide teachers' behaviors in the classroom. Conners also identified a number of beliefs that teachers held and which supported these principles. These principles and beliefs were derived from stimulated recall interviews with nine teachers; three each from first, third and sixth grades in three schools.

Conners (1978) classified principles into overarching principles, general pedagogical principles and psychological principles. Three overarching

principles were used by all the teachers in the study: teacher authenticity, suppressing emotions, and teacher self-monitoring.

Principle of Teacher Authenticity. This principle involved teachers' presenting themselves to students as human beings who are approachable and sometimes make mistakes. The mistakes the teachers make may be accidental or sometimes they may be deliberate.

Principle of Suppressing Emotions. This principle is the same as the one described previously by Marland (1977). Teachers hide their emotions and feelings from students, usually at times when they are under duress. This suppression of emotions is often a management strategy. Conners (1978) also noted that at times teachers deliberately violated the principle, using the display of emotion as a "last straw" attempt at managing student behavior.

Principle of Teacher Self-monitoring. Self-monitoring is used to refer to teacher self-awareness or self-criticism. This principle indicated that teachers were reflecting critically on their teaching. All teachers in the study displayed self-monitoring behavior.

Conners (1978) discussed five general pedagogical principles: cognitive linking, integration, general involvement, equality of treatment and closure.

Principle of Cognitive Linking. This principle referred to teachers' recognition that new material should be related to information that students already possess.

Principle of Integration. Integration was practiced by the teachers when they crossed subject areas boundaries and used the lesson content under discussion to present skills or concepts that would normally be dealt with in another subject area. Integration also referred to the use of skills concepts and materials in one subject area to reinforce the retention or understanding

of skills raised in other subject areas. Conners noted that the use of this skill may be consciously planned, or occur quite spontaneously.

Principle of General Involvement. This principle referred to teacher attempts to involve students in the lesson in order to develop some aspect of their personality, to socialize students into the classroom scene or to minimize the influence of the teacher in the lesson. All of the teachers in the study used this principle and believed that all students should become involved in the lesson. This principle was applied most often in lessons involving discussion.

Principle of Equality of Treatment. This principle referred to attempts by the teacher to treat all students equally and consistently when they were in a group situation. It was also used when teachers were punishing students for the same offense and did not discriminate among those to be punished.

Principle of Closure. This principle referred to the teacher behavior of reviewing, summarizing, and evaluating key points at the conclusion of a lesson. Closure seemed to be based on two assumptions. First, repetition is important to learning; and second, it provided the student an opportunity to check his understanding of the information.

Conners (1978) also mentioned a third type of principle, psychological. Psychological principles were not discussed as specifically as the other two categories. These were described as a set of miscellaneous principles which indicated that the teachers were consciously maintaining-enhancing the self-concepts of students, attending to classroom atmosphere, and catering to individual differences.

Conners (1978) also discussed six kinds of beliefs which teacher held and which supported the principles just mentioned. These included: General pedagogical beliefs, developmental beliefs, general beliefs concerning learning, beliefs concerning specific learning principles, beliefs concerning

memory, and beliefs concerning general psychological principles. General pedagogical beliefs were concerned with the general role of the teacher, the role of the teacher in specific teaching-learning situations and general beliefs about pupils. Beliefs in this category were expressed by all nine teachers. Beliefs concerning the role of the teacher indicated that the teacher should be approachable and supportive, pupils should be treated equally and an absolutely quiet classroom was undesirable. Beliefs concerning specific learning-situations usually referred to how teachers should direct discussion or how small group activities should be managed. Teachers generally believed that they should be careful not to over-dominate, should involve all students who desire to participate, should encourage shy or quiet children to participate, and should not have to respond to all students' comments. Teachers generally believed that when managing small group activities it was better to ignore small mistakes when the group was functioning harmoniously rather than disrupting the flow of group activity and that students should be disciplined quietly to avoid disrupting the other members of the group. General beliefs about pupils usually focused on the belief that student behavior was determined to a large degree by the student's knowledge of and expectations for the teacher's behavior.

Developmental beliefs were expressed by seven of the nine teachers. These were usually general beliefs concerning the behavior that was considered typical or appropriate for a certain age group. Beliefs focused on two areas, how a child's level of development influenced the learning process or influenced the child's general behavior. Beliefs about elementary students usually referred to their short attention span, their egocentricity, or their tendency to view the world in "black-and-white" terms. Few references were

made to a child's readiness for learning, stages of cognitive development, or a child's psychomotor development.

General beliefs concerning learning centered on teacher conceptions of how learning best took place. Learning was seen as occurring through repetition, problem solving and the student's active involvement in the learning process. Teachers also believed that learning should be meaningful, should provide the student with concrete experiences and should provide a variety of stimuli.

Beliefs concerning specific learning principles usually stressed the importance of particular principles such as reinforcement, motivation, transfer of learning and self-concept maintenance-enhancement.

Beliefs concerning memory were most commonly expressed as the use of associated cues with material to be remembered. Teachers tended to use these cues with material they thought the student would have difficulty remembering. It was thought that the cue would help the student's recall.

Beliefs concerning general psychological principles were those that were expressed least. The few beliefs referred to included the belief that it was important to foster individual differences and beliefs that group discussion would enhance the social and personality development of shy students.

In sum, the focus of teacher beliefs and "principles" identified by Marland and Conners is on particular aspects of classroom interaction and student characteristics that affect the nature of that interaction. This is what one would expect in view of their methodological procedures: asking teachers to explain their videotaped actions in actual classroom performances.

The studies reviewed above, ranging from unfocused interviews outside the classroom to focused interviews, to interviews based on videotapes of teachers' actual practice, reveal an increasing specificity of beliefs, and an increasing emphasis on teachers' views of students as aspects of their

classroom environments. All of this research provides valuable insight into teachers' beliefs, but the apparent sensitivity of results to methods used suggests that the search for "teachers' beliefs" per se may be futile. Each new sample of teachers, each new school context, and each new methodological procedure is likely to produce a different taxonomy or list of "beliefs" or "principles." Two responses to this problem are, first, to explicitly focus research towards the investigation of teachers' beliefs about specific areas of the teaching environment: for example, teachers' views of students, or techers' views of curriculum; and second, to make more explicit the characteristics of the teachers and their environments which may lead them to enunciate different systems of beliefs. In the sections that follow research on some of the major content areas of teacher beliefs -- teachers' conceptions of their roles, their beliefs about students, and their beliefs about subject matter -- are reviewed. In addition to this, issues concerning the sources of teacher beliefs and contextual constraints on teacher beliefs are examined.

The Content of Teacher Beliefs

Research on teacher's beliefs about five specific areas is reviewed below. These areas are: Teachers' beliefs about their roles, teachers' views of their students, teachers attributions and expectations for students, teachers' beliefs about curriculum and subject matter issues, and sources of and influences on teacher beliefs.

The Role of the Teacher

The teacher's role conception was one of the factors Conners (1978) identified as influencing teacher behavior in the classroom. He noted that teachers held clear conceptions concerning their roles and that these role conceptions affected the way teachers interacted with students.

Conners was unable to identify a total role conception common to all teachers in the study. Three of the nine teachers studied did indicate that they did not believe that teachers had to do all the teaching in the classroom and indicated that peer tutors could play a significant role in the teaching-learning process. Six of the teachers stressed student involvement in decision making. It was felt that student involvement would provide motivation, encourage independent thinking, and teach students to accept responsibility for decision making.

Similarly, Janesick (1977, 1978) identified the teacher's role conception as a strong influence on his "classroom perspective." She noted that the teacher's talents as a performer and dramatist, his belief system which concentrated on respect and cooperation, his personal qualities as a leader, and his involvement with groups outside the classroom such as the art teacher's association seemed to have a significant influence.

Unlike Conners (1978), Metz (1978) was able to identify two distinct types or role conceptions of eighth grade teachers studied in two schools. These types were labeled "developmental" teachers and "incorporative" teachers. Developmental teachers were seen as viewing childrens' interests as integral parts of learning. These teachers were not only concerned with identifying childrens' interests, but also with promoting their extension. This entailed not only finding connections between the child's interests and the activities in the classroom, but also helping the child create new interests. Incorporative teachers, on the other hand, were seen as viewing their roles as teachers not in terms of identifying and promoting student interest, but rather, in terms of transmitting knowledge, culture, heritage, values, and attitudes to the next generation. In this context the student is viewed as an empty vessel or blank slate to be filled with knowledge. Thus, the incorporated teachers "focused on the materials to be learned and the

rules to be followed and took the children's part in the learning process more or less for granted" (Metz, 1978, p. 49).

It is important to note that an integral part of the teacher's "role conception" appears to be how she or he views students in the classroom. The following section will review areas of research concerned with teacher beliefs about students.

Teacher Views of Students

This section will review studies which attempted to identify the ways teachers conceptualized their students. The aims of these studies ranged from the simple identification of the teachers' systems for categorizing students, to linking these systems to different aspects of teaching.

The category systems themselves are first outlined and compared. The remainder of the section then describes specific studies linking teachers' conceptions of students to other aspects of the teachers' classroom practice.

Category Systems Used to Describe Students. Table 1 summarizes categories identified by various researchers (Ball, 1981; Conners, 1978; Morine-Dershimer, 1978-79a; Nash, 1973; and Taylor, 1976) as those used by teachers to classify students. The categories were derived in a number of different ways. Conners' were derived from stimulated recall interviews with nine elementary teachers. The categories established by Nash, Ball, and Taylor were all derived from Kelly's (1955) repertory grid technique (see Methodology section for discussion of this technique). The procedures used by Morine-Dershimer were similar to Kelly's technique.

An examination of the categories summarized in Table 1 reveals that most of the category systems contain references to academic or ability traits, classroom behavior, and sociability characteristics. However, the table also reveals a fair amount of diversity in terms of the specificity of the

Table 1

Five Studies of Teachers' Category Systems Used to Classify Students

Study	Method of Inquiry	Teachers	Categories
Connors (1978)	Stimulated Recall	9 elementary teachers; one each from first, third and sixth grades in three schools.	personality, academic ability, academic performance, classroom behavior, social behavior, home background, physical characteristics, general information
Taylor (1976)	Repertory Grid	48 elementary school teachers	academic achievement, personality characteristics, behavior and relationship with teacher, home background interests and hobbies, physical, miscellaneous
Morine-Dershimer (1978-79)	Pupil Sort	5 elementary teachers	ability/achievement, involvement in instruction, personality, peer relationships, activity orientation, growth/progress
Ball (1981)	Repertory Grid	2 secondary teachers	anti school-pro school, lazy-hard working, does not try-always trys, no concentration-always concentrates, mature-immature, difficult-responsive, erratic-consistent, demanding-self sufficient, uninterested-eager to please, mucks about-serious, lacks school ability-has school ability, talkative-quiet
Nash (1973)	Repertory Grid	8 elementary teachers; 4 secondary teachers	Elementary--hardworking-lazy, mature-immature, well behaved-poorly behaved, bright-dull, does good work-does poor work, high I.Q.-low I.Q. Secondary--bright-dull, lively-lumpish, likeable-less likeable, well behaved-less well behaved, sociable-less sociable

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categories as well as the content. This may be a function of a number of variables, including the different methodologies used to extract the categories, the differing numbers of teacher studied (the number of subjects ranged from two to forty-eight), differing grade levels of the teachers studied, as well as a variety of characteristics associated with the different school sites. There is essentially no way to determine the source of the diversity or whether one could expect to find any or all of these categories represented in future studies of teachers' views of students.

Some of the studies already mentioned have undertaken these tasks. These and additional studies focusing on these issues are reviewed below.

Group Differences in Beliefs About Students. Most studies of teachers' category systems for classifying students have not examined how aspects of these systems vary across differing groups of teachers. One exception is a study by Bussis et al. (1976) of sixty elementary teachers. This study described group differences in teachers' orientations toward students. The orientations were not derived from sorting tasks, as in most of the other studies reviewed here. Instead, Bussis et al. analyzed teacher responses to questions about three dimensions: the emotional needs and feelings of students, students' interests and choices, and social interaction among students. Within each of these categories, four orientations were used to classify the teachers in the study.

Teachers were placed in one of four orientations on the basis of their responses to questions concerning the emotional needs and feelings of students. These orientations included: (A) the needs and feelings of students are only remotely perceived by the teachers and lack reality for the teachers; (B) the needs and feelings of the students are perceived as real and their expression is desired by the teachers, but they are also seen to be in

conflict with learning; (C) the expression of students' needs and feelings is seen as a necessary context for learning; and (D) the expression of students' needs and feelings is seen as integral to and inseparable from the learning process.

Four orientations were also used to group teachers on the basis of their responses to questions about students' interests and choice. Teachers in orientation A were unlikely to talk a great deal about children's interests unless specifically asked about them. When interests were discussed, these teachers tended to use sex-role stereotypes (for example, boys are interested in science while girls are interested in reading). Student choice was highly restricted. Orientation B teachers shared two characteristic beliefs. First, they believed that worthwhile learning could occur when children pursued their interests and activities, but this was restricted to activities that were regarded as "enriching" or "additional learning." Student choice involved selection from a limited number of choices presented to the teacher. Thoughts about student interest were similar to those of Group A teachers. Teachers in Orientation C differed from those in Orientation B in two major respects. First, these teachers thought about interests and choice in terms of individual patterns rather than group propensities and they saw definite connections between children's interests and their learning in reading and mathematics as well as those activities seen as "enriching" or "additional learning." These teachers were much more aware of the variety and strength of interests represented in their classrooms. Student interests were seen as manipulable by the teacher and easily influenced by external factors such as peer pressure or the attractiveness of materials. Expressions of student interest were accepted at face value without trying to discover the meaning of a particular expression of interest. Student choice was viewed as a selection from among many alternatives and was also seen as an opportunity for teachers

to emphasize the importance of carry-through and responsibility once the choice was made. Teachers in Orientation D believed that all children, by nature, are interested and curious, and that such interests have a place in school. Teachers in this orientation saw their role as one of identifying and stimulating interests rather than one of creating interests in children. Childrens' interests were seen as integral to learning and these teachers were not only concerned with identifying interests but also with promoting their extension. This meant finding more and more connections between the child's interests and the activities in the classroom. (These teachers appear quite similar to the "developmental" teachers described by Metz, 1978, earlier.)

Bussis et al. also grouped teachers according to four orientations related to their beliefs about the desirability and consequences of social interaction among children. Teachers in Orientation A generally did not perceive interaction among students as significant for learning. Orientation B teachers perceived interaction as potentially interfering with learning. Teachers in Orientation C saw student interaction as a matter of children "instructing" one another or as learning socially accepted norms. Finally, teachers in Orientation D perceived interaction as a matter of reciprocity, as a process of student learning -- either cognitive, or personal-social, or both.

While the work of Bussis et al. leaves something to be desired -- it is not clear, for example, what the sources of teacher orientations are -- it does illustrate that research on teacher beliefs must take into account group differences among teachers. It also suggests that these group differences in belief systems will not be simple products of teachers being "experienced" versus being inexperienced, or "effective" versus "ineffective" (the two dimensions that are most often used to differentiate teachers in research on

teacher thinking -- though many researchers don't make even these distinctions).

In addition to frequently assuming homogeneity in the beliefs of teachers, much teacher thinking research also makes an assumption about the stability of beliefs over time. Research on this point is examined below.

The Evolution of Teacher Concepts Over Time and Their Relationship to Curriculum-Management Systems. Most of the studies of teacher beliefs are synchronic and do not take into account either variability over time or the evolution of beliefs as teachers gain greater knowledge of their students or classroom contexts. One exception to this generalization is Morine-Dershimer's (1978-9a) comparison of teacher views of students over the course of a school year.

Morine-Dershimer (1978-79a) administered a student sorting task to five elementary school teachers at five points during the school year: at the end of the first day of school in September; in November, shortly after students' diagnostic reading test scores were given to the teachers; in January, directly following a reading lesson; in March, directly following a reading lesson; and in late May, shortly before the end of the school year. Each teacher was presented with a set of cards on which the names of the teacher's students were written. The teacher was then asked to group the students in ways that the teacher thought the students behaved or responded similarly in class. After the grouping task was completed, the teacher was asked to explain the similarities and differences between the groups. The teacher was also asked if the groups could be further divided into sub-groups or if the teacher could think of additional ways to group the cards. This process continued until the teacher could generate no new groupings. The teacher was then asked to group the students one more time according to their estimations of student success in reading. During September and November, teachers were asked to

predict reading success for the remainder of the year; during January and March, teachers were asked to estimate success in the day's lesson; during May, predictions were for the following year.

Teacher responses were analyzed according to "content", "structure", and "valence".

Morine-Dershimer (1978-79a) reported that six different types of pupil characteristics were generated by teachers fairly frequently. In order of frequency of teacher use, the characteristics were: Ability/Achievement; Involvement in Instruction; Personality; Peer Relationships; Activity Orientation; and Growth/Progress. These categories seem fairly self-explanatory with the exception of Activity Orientation. Activity Orientation referred to a teacher's tendency to group students according to the activity in which they had been engaged, working on SRA skill builders, etc.

Morine-Dershimer found that the content of teacher conceptions of students did seem to shift over time. In September, when teachers were just getting to know the student, the focus was on pupil personality. In November when classes were well under way, teachers focused on pupil involvement in instruction. In June, at the end of the school year when teachers were looking back over the year, teachers focused on growth/progress and on peer relationships. Thus, teachers conceptions of pupils appeared to be influenced by the contextual factor of time of year. Interestingly, at no time of year was the pupil ability/achievement a dominant characteristic for teachers when organizing information about pupils.

Shifts in teacher focus were also apparent when comparing the groups teachers established in September, November, and June with the groups established in January and March immediately after reading lessons. The groupings of students in January and May reflected the heavy use of activity

orientation to categorize students. Pupil ability and the activities in which pupils were engaged were also important factors. In contrast, the groupings for September, November, and June focused on pupil personality and peer relationships. Pupil involvement in instruction was an important factor in both types of groupings.

An examination of individual responses of teachers revealed a relationship between differences in teacher focus in the grouping task and the curriculum-management systems in use in their classrooms. For example, a teacher who utilized individual instruction in reading and pupils working alone on teacher-selected materials focused on pupil involvement in instruction. This focus was a necessary component of an effective curriculum-management system given the types of tasks demanded of students in her classroom.

Morine-Dershimer found three types of groupings or structures used by teachers in the pupil sort task. These groupings were labeled "unique label" categories, "mixed breed" categories, and "singling out" categories. Unique label groupings were those labels used by teachers that did not fit readily into the categories mentioned earlier. Examples of unique label categories included: fine motor coordination; special pupil interests; previous teacher acquaintance with pupil; pupil tendency to verbalize about the task being performed; and the probability that parent conferences will or will not be effective in helping students improve. Mixed breed groupings were those where non-discrete groups were used or subgroups were not clearly related to an overall heading. An example of a mixed breed grouping given was a group which contained the following sub-groups: high ability in drawing and verbal response; need to watch for extraneous talking; cried during class; and low ability. Singling out categories were sub-groups which contained a single student. These occurred when a teacher saw one student as so "different" that

she/he was unable to use a category label to group this student with any other members of the class.

Morine-Dershimer notes some shifts in teachers responses over time in their tendency to form these kinds of structures in their groupings. However, the logical structure of teacher conceptions of students appeared to be less affected by contextual factors than the content of teacher conceptions of students. When the responses of individual teachers were examined in terms of the logical structure of their conceptions of students, Morine-Dershimer found that differences from teacher to teacher could be accounted for in terms of the type of curriculum-management system the teacher employed in her classroom.

The labels teachers used to form student groupings could be categorized according to valence (positive, neutral, or negative) as well as by content as discussed earlier. Morine-Dershimer found shifts in teacher patterns of labeling over time with regard to valence. The general pattern seemed to be that negative labeling peaked in November, then decreased. Neutral labeling steadily increased over the year and positive labeling remained quite stable. Differences in valence were also found when comparing observational settings. The groupings done immediately after reading lessons indicated that pupils tended to be labeled more positively than in the groupings done at other times. When individual teacher groupings were analyzed it was found that five teachers were predominately positive in their labelings, three were predominantly neutral, and two were predominantly negative. The predominantly negative teachers were special education teachers. The curriculum-management systems seemed only somewhat responsive to the valence values of the teachers' grouping patterns.

Teachers' Concepts of Students and Students' Behavior, Academic Performance, and Ability Track Placement. Some researchers have attempted to link teachers' concepts about students to the way students behave and perform academically in the classroom (see the section on teacher expectations and attributions for similar lines of research). While no definite causal connections can be made, some intriguing correlations have been uncovered.

Ball (1981) used Kelly's repertory grid procedure (see discussion in methodology section) to study teacher perceptions of students. This was part of a larger intensive study of one school by participation observation. In addition to the administration of the grid, classes were observed, teachers and students were interviewed, questionnaires were administered, school records were analyzed, and time was spent in the school community. Kelly's repertory grid was administered to two secondary teachers; one a teacher of English and the other a geography teacher. Both teachers taught the same group of students. The English teacher produced five bi-polar constructs: anti-school - pro-school, lazy - hard-working, does not try - always tries, no concentration - always concentrates, and mature - immature. The geography teacher produced nine bi-polar constructs: immature - mature, difficult - responsive, erratic - consistent, demanding - self-sufficient, lazy - hard-working, uninterested - eager to please, muck about - serious, lacks school ability - has school ability, and quiet - talkative. Ball had the teachers score each of the students on a four-point scale across the bi-polar constructs they produced with one being the most favorable. Students were then listed in order according to the total scores they received. A comparison of the rank-order lists for each teacher showed that seven of the top eleven positions in the English teacher's rank-order of perceptions were occupied by students in the top eleven examination positions; the geography teacher also had seven. Seven pupils also appeared in the top eleven

positions in both teachers' list. Six students were found in the bottom eleven of both lists. All of the students except one were low achievers and all presented behavior problems to their teachers in lessons. The correlation between the teachers rankings and the students' examination positions was significant at the .001 level. Ball makes two points concerning the relationship between academic achievement, behavior and the teachers' perceptions of students:

> First, the most favourably-perceived pupils in the form tend to be those who are pro-school and academically successful. Those pupils who are affiliated to the anti-school group but are well-perceived tend to be less well-integrated or of low status in these groups; they diverge from the prevailing norms of their groups. Second, behaviour appears to be the more important criterion of differentiation among the pupils....Altogether, the relationship between behaviour and performance must be seen as self-reinforcing in terms of teachers' perceptions, motivation, and classroom climate. Those pupils who embrace membership of the anti-school sub-culture because of lack of success in schoolwork become committed to a behaviour pattern which virtually eliminates the possibility of being successful in the future. (p. 75)

Nash (1973) also used Kelly's repertory grid procedure to study teachers' concepts of students. He followed a group of students from their last year in elementary school into their first year in secondary school and examined both elementary and secondary teachers' conceptions of these students. While there were no major differences in the category systems used by the two groups of teachers, Nash did find an interesting connection between the teachers' constructs and student placement in ability streams.

Nash examined the teachers' perceptions of students selected at the end of the first term of secondary school for placement in a remedial class. In addition to regarding these students as of low ability, both elementary and secondary teachers also perceived these students as dull, less capable, troublesome, badly behaved, passive, stolid, immature, and lacking in confidence. Some teachers also admitted finding them less interesting. Thus,

the children being placed in the remedial class were not only seen as being of low ability but were also negatively perceived in all other respects. Nash suggests that the criteria for inclusion in the remedial class is not only low ability but a completely unfavorable image in the eyes of the teacher. Nash notes:

> The message is clear. Inclusion in the remedial class is as much determined by the teacher's unfavourable perceptions of a pupil as by the pupil's ability. The reasons for this are unclear. It may be that teachers are not always aware that the low ability pupils in their classes are really poor unless they are also perceived unfavourably in other respects. Again it may be that when teachers are nominating pupils for the remedial class they prefer to lose the low ability children they favour least. Whatever the reasons are the remedial class ends up with a great many children whom the teachers perceive very unfavourably indeed. (p. 86)

Studies of ability grouping in American schools have also suggested that non-academic characteristics of students were important determinants of track placement (Cicourel and Kitsuse, 1963; Rosenbaum, 1976) and grouping within classrooms (Rist, 1970), and that students within different tracks receive different forms of instruction.

Teacher Attributions and Expectations for Students

The preceding sections examined research on teachers' general category systems for describing their students. While useful insights have come from such research, the drawing of connections between such category systems and student performance and teachers' patterns of action in the classroom is still in a preliminary stage. However, two related lines of research, focusing on teachers' perceptions of the causes of student behavior, and the links between teacher expectations for students and differential treatment of those students, are much more developed. Research in these two areas is summarized below.

Four category systems describing teachers' attributions for the causes of student behavior are referred to frequently in the literature (Weiner, Frieze,

Kukla, Reed, Rest, & Rosenbaum, 1971; Frieze, 1976; Bar-Tal & Darom, 1979; and Cooper & Burger, 1980). Although all four systems have been used to describe teachers' attributions for the causes of student performance, only one (Cooper & Burger, 1980) was developed originally to describe teacher attributions. The other three category systems were developed to describe students' attributions for the causes of their performance, and were then adapted to describe teacher attributions. Table 2 summarized the category systems commonly used to categorize teacher attributions. Weiner et al.s' (1971) system contains the fewest categories: ability, effort, task difficulty, and luck. Later research by Frieze (1975) showed that students also mentioned other causes, including the teacher, being in a good or bad mood, feeling sick, and help or hinderance provided by other people. It has also been shown that the specific set of causes used to explain success or failure depend heavily on the specific task being considered (Frieze & Snyder, 1980). For example, classroom tests tend to generate predominantly effort attributions while success at an art project may be attributed to both effort and ability. Other causal factors which have been identified as important for school achievement include stable effort (a consistent pattern of diligence or laziness), personality, interest in the subject matter, and the physical appearance of the student (Bar-Tal & Darom, 1979; Cooper & Burger, 1980; Elig & Frieze, 1975; Frieze, 1976, 1980; Weiner, 1979).

Researchers have also developed a three-dimensional system for viewing the various causal explanations suggested in Table 2. The three dimensions include: "internality," "controllability," and "stability." Internality concerns whether the cause of an event is attributed to the primary actor in the situation (typically a student in an academic situation) and is thus, internal, or whether the cause is attributed to something in the environment or to some other person and is therefore external. For example, a student may

Table 2

Categories Used to Describe Teachers' Attributions for the Causes of Student Performance
(adapted from Cooper & Burger, 1980 and Clark & Peterson, in press)

Weiner et al.(1971)	Frieze (1976)	Bar-Tal & Darom (1979)	Cooper & Burger (1980)
Ability	Ability	Ability	Ability (academic, physical, or emotional)
Effort	Stable Effort	Effort During Test	Previous Experience
Task Difficulty	Immediate Effort	Preparation at Home	Acquired Characteristics (habits, attitudes, self-perceptions)
Luck	Task	Interest in the Subject Matter	Typical Effort
	Other Person	Difficulty of Test	Interest in the Subject Matter
	Mood	Difficuty of Material	Immediate Effort
	Luck	Conditions in the Home	Attention
	Other	Teacher	Teacher (quality and kind of instruction, directions)
			Task
			Other Students
			Family
			Physiological Processes (mood, maturity, health)

score high on an examination because of internal causes such as ability or effort. The student may also be successful because of external factors such as the test being easy, assistance from another student, or a good teacher. The dimension of controllability refers to the degree of control of the primary actor in the situation. For example, students control their effort, but not necessarily their ability. Therefore, effort is categorized as controllable, but abilities are viewed as uncontrollable. The third dimension used to classify causal attributions is stability. Ability changes little over time and is therefore considered stable. However, effort, mood, fatigue, and luck are highly changeable and are therefore classified as unstable. These three dimensions are typically conceptualized as dichotomies, although they might be more accurately viewed as on a continuum (Frieze, 1981).

Factors That Affect Teachers' Attributions. A number of studies have sought to determine whether teachers credit themselves or their students for success and whether they blame themselves or the students for failure. The results, however, have been mixed. Some studies provide evidence for an ego-enhancing/defensive pattern where the teachers credit themselves for success and blame the student for failure (e.g., Beckman, 1970; Brandt, Hayden, & Brophy, 1975; Johnson, Feigenbaum, & Weiby, 1964) and others provide evidence for a nondefensive pattern where teachers credit the student for success and blame themselves for failure (Ames, 1975; Ross, Bierbrauer, & Polly, 1974).

Other factors which have been hypothesized as affecting teacher attributions for the causes of student performance include: teacher's perception of the student's past performance, race, social class, and sex.

Peterson & Barger (cited in Clark & Peterson, in press) suggest that teacher attributions about a student's present performance are affected by the student's past performance in that the teacher attempts to maintain a "consistent picture." For example, teachers are likely to attribute a

predicted outcome such as high performance on a test by a student perceived in the past as being of high ability to a stable factor such as ability. However, teachers are likely to attribute unpredictable or surprising outcomes such as high performance by a student perceived as low in ability to an unstable factor such as luck.

The effects of race and social class on teachers' attributions have not been well studied. Wiley and Eskilson (1978) found that teachers tended to perceive Black students as having less control over their successes and failures than White students. Teachers also tended to attribute Black students failures as due to bad luck rather than lack of ability. Cooper, Baron, and Lowe (1976) found that the effects of race on teachers' attributions are mixed. Studies by Wiley and Eskilson (1978) and Hanes (1979) have indicated that sex was not a significant factor in teachers causal attributions for students' performance. However, Dweck, Davidson, Nelson and Enna (1978) found that teachers were more likely to make statements attributing failure to a lack of effort for boys than for girls.

Teacher Attributions and Teacher Classroom Behavior. The majority of studies available (e.g., Cooper & Burger, 1980; Covington, Spratt, & Omelich, 1980; King,1980; Medway, 1979; Meyer, 1979; Silverstein, 1977; and Weiner & Kukla, 1970) tend to show a relationship between teacher attributions for the causes of student performance and teacher behavior towards the student in the classroom. The bulk of the evidence indicates that students who are preceived as trying or expending effort are rewarded more and punished or criticized less by the teacher than students who are perceived as not trying. Studies also indicate that teachers show a greater intention to criticize failure when it is perceived as due to internal causes (e.g., physiological processes)

Failure perceived as caused by external events (e.g., task, other students, family) led to the least intention to criticize.

One study (King, 1980) suggests that teachers' attributions for the causes of students' performance may affect the number and kinds of interactions that the teacher has with the student. The student whose success was attributed to ability by the teacher was often called upon when the teacher wanted to change the pace or direction of the lesson. The teacher expected that when the student whose success was attributed to effort requested help, it would only be a minor problem, to be rectified quickly. The student who was perceived as unsuccessful because of lack of ability was provided with extra help from the teacher. This is in contrast to the student who was perceived as unsuccessful due to lack of effort; this student was seldom interacted with by the teacher.

There is also some indication (Brophy & Rohrkemper, 1981) that teacher attributions for a student's performance affect the goals that teacher set for students and the strategies they employ in attempting to realize those goals. Attribution patterns of teachers were also seen as affecting the strategies a teacher used to cope with student misbehavior.

Teacher Expectations for Students and Teacher Classroom Behavior. There is a considerable amount of research showing that teachers vary their behavior towards high and low achieving students (see Braun, 1976; Brophy & Good, 1974; Cooper, 1979; and Rosenthal, 1974, for review). Good (1980) lists the following ways that teachers differentiate their behavior toward students:

1. Seating slow students farther away from the teacher and/or seating lows in a group (making it harder to monitor and/or to treat low-achieving students as individuals).

2. Paying less attention to lows in academic situations (smile less often and maintain less eye contact).

3. Calling on lows less often to answer classroom questions or to make public demonstrations.

4. Waiting less time for lows to answer questions.

5. Not staying with lows in failure situations (providing clues, asking follow-up quesitons).

6. Criticizing lows more frequently than highs for incorrect public responses.

7. Praising lows less frequently than highs after successful public responses.

8. Praising lows more frequently than highs for marginal or inadequate public responses.

9. Providing low-achieving students with less accurate and less detailed feedback than highs.

10. Failing to provide lows with feedback about their responses more frequently than highs.

11. Demanding less work and effort from lows than from highs.

12. Interrupting the performance of low achievers more frequently than that of high achievers (p. 7).

Factors Affecting Teacher Expectations and Behavior. There is a substantial amount of evidence suggesting that student race, sex, ethnicity, and social class are related to teacher expectations (Adam & LaVoie, 1974; Burford, 1973; Coates, 1972; Eaves, 1975; Guskin, 1971; Harvey & Slatin, 1975; Miller, McLaughlin, Haddon, & Chansky, 1968; Pugh, 1974; Rosenfeld, 1973; Wiley & Eskilson, 1978; Williams & Whitehead, 1971). These studies indicate the following concerning teacher expectations:

1. White students are viewed more favorably than Black students, both academically and behaviorally;

2. Teachers have lower expectations for Blacks than for Whites;

3. Teachers expect greater achievement than warranted from Whites and significantly underexpect for Black and Mexican-Americans;

4. Teachers more often expect White children to succeed and Black children to fail regardless of social class;

5. Teachers perceive Blacks as being of a lower social class than they actually are;

6. Teachers tend to attribute higher achievement to females than to males;

7. Teachers have higher expectations for females than for males for both academic achievement and social behavior;

8. Teacher evaluations of students are related to race, ethnicity, and social class.

It should be noted that not only do teachers form expectations of students based directly on sex, race, ethnicity, and social class, but their expectations are also influenced by such variables as student test scores, appearance, language style, speed of task performance, and behavior characteristics which may be culturally defined (cf. Persell, 1977).

There are also a number of studies which have shown that variables such as sex of the child, race of the child, race of the teacher, and socioeconomic status of the child are correlated with differences in teachers' verbal and nonverbal behaviors as well.

Studies by Good, Sikes, & Brophy (1973) and Meyer & Thompson (1956) found that boys received more positive and more negative comments from teachers than did girls. Davis (1967) also found that boys received more negative comments from the teacher, but no differences were found between males and females on the amount of verbal praise recieved.

A number of studies have shown differences in teacher behavior towards Black and White children. Rubovits & Maehr (1973) found that Black students received significantly less attention and praise than did White students. Another study (Hillman & Davenport, 1978) found that Black students and male students received a greater amount of the teachers' attention than White students or females. However, the greater amount of attention towards Black students was in categories such as receiving more criticism, receiving more comments directed at controlling their behavior, and less acceptance of the students' questions or responses.

There are also studies comparing the reinforcement patterns of Black and White teachers toward Black and White students. Brown, Payne, Lankewich, & Cornell (1970), Byalick & Bersoff (1974) and Feldmand & Donohoe (1978) found that teachers gave more praise and less criticism to students of the opposite race. Female teachers of both races verbally reinforced opposite race boys the most. Byalick & Bersoff (1974) also found that teachers of both races touched children of their respective races with greater frequency in the classroom.

Two studies (Friedman, 1976; Heller & White, 1975) found that social class seemed to influence how often students were reinforced, both positively and negatively.

This part of the report has summarized a large body of research on teacher expectations and teacher attributions for the causes of student behavior. These studies indicate that the beliefs of teachers are affected by a large number of factors, including: teacher perceptions of the sources of student success and failure, teacher perceptions of students' past performances, and teacher perceptions related to race, ethnicity, social class, and sex of students. Studies also indicate that these beliefs, in turn, influence teacher behavior in the classroom in a number of ways, including: the number and kinds of interactions that teachers have with students, the goals teachers set for individual students, and the strategies teachers use to cope with student misbehavior. Many of these factors were attended to when designing the TBS study and have been the focus of project research activities.

Teachers Beliefs about Curriculum

Researchers have noted that curriculum or subject matter concerns seem to play a relatively small role in teachers thoughts (e.g., Brophy, 1984). Some of this may be attributable to methodologies used in this research (e.g.,

stimulated recall interviews may emphasize teachers thoughts about classroom interaction at the expense of their thoughts about content) or by the overemphasis of studies on elementary school teachers. Whatever the reasons, research which sets out with the intention of studying teachers' views of curriculum has produced an interesting and complex picture of the interplay of teachers beliefs and contextual constraints in the determination of how beliefs about subject matter affect teaching.

Teachers' Implicit Theories and the Implementation of Curricula. A study by Olson (1980; 1981) took as its starting point the problem of implementation of new curricula and its relationship to teachers' implicit theories. Eight teachers of science in three British comprehensive secondary schools were asked to discuss their work with an innovative science curriculum project over a three month period. Each teacher was interviewed for a four hour period on four occasions. The study also used a version of the repertory grid technique with each teacher to elicit labels for constructs the teachers' used when thinking about teacher and student behavior. This technique involved the presentation of twenty teaching events which had been selected to reflect a wide range of teaching methods in science. Teachers were asked to sort and group the twenty teaching events (elements), discuss the groupings, and produce group labels. The discussion of the groupings and the group labels were used to develop "constructs." These constructs and the twenty elements were then placed in a grid format and the teacher was required to rate the degree of association between them. The results of the ratings were used to describe the relationships among the constructs.

Olson determined from the grid results and the interviews that teacher classroom influence and control was the most important underlying construct in the teachers' implicit theories of teaching. However, the science

curriculum being implemented at the time of the study called for reduced teacher influence in the classroom

> as a consequence of project features such as: free ranging discussion episodes; downplaying in the design the importance of content in science teaching and examination preparation; requiring teachers to instruct outside their discipline. (Olson, 1981, p. 265)

This created a dilemma for the teachers because of a tension between their beliefs about teaching and the teaching practices urges by the innovative curricula. As Olson notes, the dilemma was resolved in favor of common practice.

> A host of project domestications occurred as the project language was translated into familiar terms. The project language was given new meaning in terms of the existing vocabulary of the teachers. For example: discussions became lectures or recitations; intellectual skill development was translated as content memorization and examination rehearsal; the integrated design was translated as a patchwork of specialized content to be unravelled and resewn; criterion referenced assessment was translated as norm based. In short, after a period of experimentation during which they saw their influence declining, the teachers re-established influence through the varied domestications of the project doctrine (Olson, 1981, p. 265).

Bussis, Chittenden, and Amarel (1976) interviewed sixty elementary teachers who were attempting to implement open or informal approaches to instruction. These researchers were interested in describing these teachers' understanding regarding curriculum, children, and the working environment. Each teacher was interviewed for about two and one-half hours. The researchers described the beliefs these teachers held about curriculum by placing each teacher in one of four curriculum construct systems. The first group of teachers (12%) were characterized by heavy emphasis on grade-level facts and skills. These teachers showed little evidence of experiment or change in the curriculum. The second group of teachers (22%) also were characterized by heavy emphasis on grade-level facts and skills, but there was considerably more evidence of change and experimentation with the curriculum. The construct systems of the group one teachers seemed quite established;

whereas the construct systems of the group two teachers were less established and there was more emphasis on student involvement. The third group of teachers also expressed "grade-level facts and skills" but this was not a dominant priority; rather, priorities concerning that a child become self-directed and begin assuming responsibility for his own learning seemed to predominate. There was also more evidence of a potentially rich curriculum. Group four teachers showed little evidence of preoccupation with grade level facts and skills. Priorities seemed to concern that a child become self-directed and or a concern that children recognize and differentiate their feelings and abilities and accept them as legitimate and worthwhile. There was also evidence of a potentially rich surface curriculum.

Beliefs About Reading and Their Influence on Instruction. Duffy (1977) and Barr & Duffy (1978) reported on a longitudinal study of elementary school teachers' beliefs concerning reading. 350 teachers were asked to sort 36 propositions about reading and reading instructions. These propositions were derived from a review of the literature on reading and were associated with five major approaches to the teaching of reading: basal text, linear skills, natural language, interest, and integrated whole. A sixth approach was later added, confused/frustrated. The 36 propositions consisted of six propositions about reading that were consistent with the six reading approaches identified. The teachers were asked to sort the statements into five categories, ranging from "most like me" to "least like me." From among the 350 teachers who completed the exercise, 37 teachers were identified who indicated they had clear and strongly held beliefs about reading. These 37 teachers were given a variation of Kelly's Role Concept Repertory Test (REP test) as a reliability check. Eight teachers who evidenced strong belief patterns on both the propositions sort and the REP Test were observed teaching reading in their

classroom ten times. Observations were recorded using ethnographic field notes and pre- and post-observation interviews were used to determine the extent to which the teachers' instructional behavior reflected their conceptions of reading. Results of the analysis indicated

> Four teachers consistently employed practices which directly reflected their beliefs; these included two teachers who had structured beliefs (basal/linear skills), a teacher who had an eclectic view, and one of the teachers having an unstructured belief system (natural language/interest/integrated whole). Of those whose practices did not reflect their beliefs, two of the teachers having strong unstructured belief systems were found to be smuggling elements of unstructured practices into an administratively-imposed program reflecting a structured view. Two other teachers holding unstructured views, however, did not consistently reflect their beliefs; one of the teachers employed practices which, to a large degree, were counter to the unstructured belief system she expoused, while a second teacher operationalized unstructured beliefs only some of the time with some pupils and some activities (Duffy, 1977, pp. 78).

Barr & Duffy (1978) reported some interesting findings from the case studies. First, the researchers found that the teachers studied held a combination of views rather than a single one, that teachers did not always make conscious and reflective decisions and that there was not a linear relationship between teacher conceptions and teacher behavior. Teacher beliefs about one aspect of instruction did not necessarily predict beliefs about another aspect. The researchers also noted that teacher beliefs influenced the teachers' selection of instructional materials and the way students are helped during reading. Finally, they mentioned that there are institutional and classroom characteristics that mediate the influence of beliefs. For example, it was found that time schedules, class composition, required testing, and constraints on materials influenced the operationalizing of teachers' beliefs in reading instruction.

Sources of and Influences on Teacher Beliefs

Most of the research on teacher beliefs concentrates on identifying the content of teacher beliefs with little attention to the sources of teacher

beliefs and the contextual constraints that influence these beliefs. This section reviews some of the teacher thinking research that does exist on these issues. One of the researchers mentioned previously in this report, Elbaz, (1981, 1983) suggested five possible sources of teacher beliefs which she referred to as "orientations". Elbaz attempted to determine where a teacher's "practical knowledge" originated, how it developed, and what guiding conceptions appeared to form the basis for the understanding the teacher had in each area. Elbaz suggested that a teacher's knowledge is learned, tested and developed through actual experience in the field. "Situational orientation" refers to the ways in which the teacher's knowledge is oriented to situations. "Social orientation" implies that some of the teacher's knowledge is socially conditioned. "Personal orientation" refers to the role of personal meaning in shaping perception, point of view, and interpretation. Implicit in the situational and personal orientations is the "experiental base" -- the teacher's knowledge growing out of the world of teaching as the teacher experiences it. Finally, "theoretical knowledge" is discussed as ranging from outright rejection to a deliberate, single-minded application of a particular theory. The teacher's position on the continuum determines the kinds of theoretical knowledge the teacher will draw upon and use in particular situations.

The personal aspect of Elbaz's orientations of practical knowledge is strongly suggested in a factor identified by Conners (1978) as affecting teacher behavior: "idiosyncratic intrusions."

"Idiosyncratic intrusions" referred to the fact that some of the teachers Conners studied exhibited strongly held beliefs, values, or personality characteristics that caused the teacher to intrude into the planned course of the lesson to relieve tension or pressure they were

experiencing. The idiosyncratic intrusion influenced the teachers to stop the lesson and lecture the students, to change the course of the lesson to avoid such concepts as death, or physically removing themselves from students when claustrophobic feelings were experienced.

Ecological or contextual constraints on teacher thinking are often mentioned by teacher thinking researchers, but are rarely closely attended to. One exception is Co[illegible]ers (1978), who identified nine characteristics of the teacher's working environment which influenced the teacher's classroom behavior. These included: Temporal, spatial, class props, grade level, the general ability level of a class, group size, grouping patterns, administrative/managerial, and climatic.

Temporal variables referred to the effects of time of the school year, the time of the day and time demand of class timetables which affected teacher instructional behavior. Spatial variables influenced teachers working in open areas. Teachers monitored noise more closely than normal, altered their teaching styles -- were less exuberant than they preferred, scheduled class discussions at times that would not disturb other classes, and developed strategies to use in lessons involving oral work to minimize student distractions caused by the activities of nearby classes. Class props had both positive and negative influences on teacher behavior. Teachers used props such as overhead projectors and posters to motivate and add interest to the lesson. However, loss or malfunction of a prop delayed the lesson and caused frustrations for the teacher and the students. Grade level, the general ability level of a class, and group size all influenced the ways in which teacher interacted with their students. Grouping patterns within the class also influenced teacher behaviors. These patterns were sometimes relatively permanent, sometimes short term and sometimes related to a particular lesson. Administrative/managerial referred to general school administrative patterns

that intruded into the classroom such as intercom interruptions or by a person delivering a message. It also referred to classroom management activities such as dealing with pupils who had lost or damaged their material. Climatic variables referred to the potential effect of the weather on the teacher, and therefore her subsequent interactions with students. It also referred to the influence of the weather on pupils and their subsequent interactive influence upon the teacher and future teacher-pupil interactions. As Conners points out, teacher folklore abounds with references to the influence of the weather upon teachers and students.

PART II: TEACHERS' "INTERACTIVE" THOUGHTS AND DECISIONS

The research reviewed above focused on teachers' beliefs or implicit theories. For the most part, these are presented in the form of researcher's models of teachers' beliefs. That is, inferential, synthetic constructions produced by the researchers on the basis of statements or actions by the teachers (instead of, for example, explicit statements by the teachers of what their goals were, what they considered their roles to be, and so on). Two assumptions which seem to underlie this research are that beliefs are diffusely applicable and that they are stable over time. They are seen as diffusely applicable in the sense that it is assumed that they do not change radically over the range of particular circumstances that the teachers may encounter: A teacher's "principles" of teaching, for example, supposedly do not change from one class period to the next; nor are the categories a teacher uses to characterize students supposed to change from one class period to another. In general, such beliefs are also assumed to be stable over time (Morine-Dershimer, 1978-79a is a notable exception to this rule).

In addition to research on beliefs, researchers have also examined teachers' thoughts on specific events or students in their classrooms. This is the research generally described as focusing on teachers' "interactive" thinking or decision-making. Because studies of this sort have relied overwhelmingly on the particular methodological technique called "stimulated recall," an examination of this technique is necessary before findings or models developed from such research can be analyzed or evaluated. Some studies, of decision-making in particular, have used "policy-capturing" or "lens-modeling" techniques, but such research is extremely problematic on methodological grounds (see Ebbensen & Konecni, 1980). Given these problems, and the fact that the TBS project also relies solely on stimulated recall

for data on interactive thinking, laboratory studies such as policy capturing will not be examined.

Stimulated Recall

"Stimulated recall" is a blanket term for a variety of interview techniques that utilize mechanical records of the teachers' actual classroom activity as guides to the interview (presently, stimulated recalls rely almost exclusively on videotape records; Semmel, 1977, is an exception, using audiotapes). The stimulated recall research can be categorized in terms of the following variables (cf. Clark & Peterson, in press, Table 4): setting (e.g., laboratory versus regular classroom); comprehensiveness (e.g., was the teacher shown edited fragments of tape, or a complete tape); number of interviews conducted with each teacher; number of teachers studied; interview format (e.g., structured questionnaire, clinical interview, teacher self-selection, etc.); other methods used in conjunction with stimulated recall; method of videotaping; and methods of analysis. The ways these variables have been treated are reviewed below (this review draws heavily on Clark & Peterson, in press, Table 4 for the first five variables listed).

Setting

Of the ten studies reviewed by Clark & Peterson (in press) -- Colker (1982); Conners (1978); Fogarty, Wang & Creek (1982) Housner & Griffey (1983); Lowyck (1980); Marland (1977); McNair (1978-79); Morine & Vallance (1975); Peterson & Clark (1978); Semmel (1977); Shroyer (1981); and Wodlinger (1980) -- two are laboratory studies (Clark & Peterson, 1978; Housner & Griffey, 1983). This means that the classroom situation studied was not part of the regular school context: Teachers and students were not acquainted with one another prior to the experiment; the subject matter to be taught was specified by the researchers; time variables were not those of normal school (e.g., the studies took place in the summer, class periods were longer than in the

regular school day); and the accountability systems differed (participants were paid, grades did not enter into school records).

Among the studies which took place in regular classrooms, there were many variables which differentiated the settings: The subject matter being taught ranged across the content areas and many different grade levels were studied (though all studies except Peterson & Clark, 1978, were conducted with elementary school teachers).

Comprehensiveness

While complete class periods were often videotaped the general practice was to use only a lesson on a specific subject matter area in the stimulated recall (the two laboratory studies, Housner & Griffey, 1983; Peterson & Clark, 1978 are exceptions: They used short segments of class time selected by the researchers or randomly selected). The length of the lessons viewed ranged from 15 minutes to one-hour.

Additional considerations may have influenced the selection of tape segments to be used in the interviews. Conners (1978), for example, used two criteria for selecting lessons to be used in interviews:

> (a) There had to be verbal interaction between teacher and pupils.
>
> (b) Each lesson had to have a number of phases that involved a variety of teacher and pupil behaviors. For example, a discussion session followed by a seatwork exercise or review of past work followed by the introduction of new work. This strategy was followed to allow for variability in teacher behavior that would provide opportunities for a wide range of principles, rules, beliefs and general teaching behaviors to be exhibited. (p. 82)

Number of Interviews

The number of stimulated recall interviews conducted with the teachers ranged from one to ten: Three studies (Fogarty, Wang & Creek, 1982; Morine & Vallance, 1975; Semmel, 1977) used only one stimulated recall; four studies used two interviews (Conner, 1978; Housner & Griffey, 1983; Lowyck, 1980;

Marland, 1977); two used three interviews (Colker, 1982; Peterson & Clark, 1978); one used six (McNair, 1978-79); and one used ten (Wodlinger, 1980). The total time a teacher was interviewed ranged from 15 minutes to around six hours. Even here there are additional complicating factors: Of those teachers who were interviewed more than once, some were interviewed with tapes of them teaching different subject matter lessons to the same students (e.g., Conners, 1978; Marland, 1977) while some were interviewed teaching the same subject matter lesson to different groups of students (e.g., Colker, 1982; McNair, 1978-79).

Number of Teachers Studied

The number of teachers interviewed in these studies ranged from one to forty. One study using more than one teacher contrasted "effective" with "less effective" teachers (Morine & Vallance, 1975); while several studies contrasted "experienced" with "inexperienced" teachers (e.g., Housner & Griffey, 1983). All studies except Semmel (1977) included experienced teachers.

Interview Format

The two laboratory studies (Housner & Griffey, 1983; Peterson & Clark, 1978) used the same structured questionnaire:

1. What were you doing in the segment and why?
2. Were you thinking of any alternative actions or strategies at that time?
3. What were you noticing about the students?
4. How are the students responding?
5. Did any student reactions cause you to act differently than you had planned?
6. Did you have any particular objectives in mind in this segment? If so what were they?
7. Do you remember any aspects of the situation that might have affected what you did in this segment?

(Clark & Peterson, in press, p. 42)

Two other studies (McNair, 1978-79; Morine & Vallance, 1975) also used a structured questionnaire:

1. What were you thinking at that point?
2. What did you notice that made you sort of stop and think? Was there anything pupils were doing that made you sort of stop and think?
3. What did you decide to do?
4. Was there anything else you thought of doing at that point, but decided against?
5. What was it?

(McNair, 1978-79, p. 28)

Peterson & Clark asked their questions after the teachers had viewed short fragments of videotape (the first five minutes of class and three one-to-three minute fragments randomly selected). McNair and Morine & Vallance allowed the teachers to stop the tape, framing the task this way:

> As we play the lesson back, please tell me to stop the tape whenever we reach a point where you were consciously saying to yourself, "Let's see, I think I'd better do this now," or "I guess I'll try doing this." I may stop the tape myself at a couple of points, but you should tell me to stop it whenever there is a point in the lesson where you know you made a specific decision about what to do next in the lesson. (McNair, 1978-79, p. 27)

In the McNair (1978) study the researcher also stopped the tape at four points:

> 1) the first time a pupil gave an incorrect answer to the teacher's question; 2) the second or third time the teacher shifted activity in which pupils were engaged; 3) and 4) randomly selected points. (p. 28)

Most other interview systems allow teachers to select points at which they wish to comment on their thoughts or decisions, but also allow for the researcher to conduct a "clinical interview" in which the researcher asks the teachers to comment on some portion of the tape that is of interest to the researcher for some, usually inexplicit, reason (e.g., Conners, 1978).

Other Methods Used

Many researchers use classroom observations of teachers in addition to stimulated recalls. However, systematic descriptions of analyses of classroom activities are usually not provided. Supplementary interviews are also

sometimes used in these studies. Marland (1977) and Conners (1978) interviewed teachers about their plans and goals before instruction actually took place. Pre-instructional interviews about planning were also used in the study reported by McNair (Morine-Dershimer, 1978-79b). Teachers in that study also engaged in a "pupil sort" interview (Morine-Dershimer, 1978-79a) in which they were asked to group their students in terms of similarities and differences.

Method of Videotaping

Just what is captured in the camera frame is not entirely clear from some of the studies, though most presumably follow suggestions similar to those of Conners (1978) that the teacher be kept in the frame at all times and that efforts be made to also capture the area of the classroom that is the focus of the teacher's attention. Filming usually takes place from the back of the room.

Methods of Analysis

Specific coding categories vary from study to study but most seem to focus on two aspects of teacher thinking: the focus or content of teachers thoughts, and the "decisions" that teachers make (see Clark and Peterson, in press, pp. 49-52, on the way decisions are defined).

What Can These Studies Say About Teacher Thinking?

As should be clear from the summary given above, stimulated recall research is extremely variable. Aggregating findings from these studies seems an extremely dubious idea and even interpreting the findings from a single study presents great difficulties. The problems of interpretation center around three issues: 1) the ambiguous status of the findings; 2) the problem of bias in the questioning; and 3) the lack of attention to context or task demands. Each of these issues will be briefly explored.

What Are the Findings Findings Of?-

Arguments about the psychological status of verbal reports of thought processes are discussed in this report's section on methodology. Here we can make the following comments. First, the stimulated recall interview is a task in which teachers are asked to view their classrooms from an unaccustomed perspective and explain what they're thinking about and why they're doing what they're doing. This is a peculiar sort of task, not something the teacher is likely to encounter often in the usual course of events. Teachers' motivations, attitudes, and assumptions about the stimulated recalls are not well examined. In addition to this, a number of confounding factors may intrude. The teachers may differ greatly in their verbal facility. Odell (1981), for example, reports that in process tracing studies expert writers often had difficulty explaining what they were thinking about as they wrote. This leads to the hypothesis that expert writers may automatize many of their decision processes and/or process many decisions in parallel. Had this been a study of teachers, the conclusion would have been that they made few decisions. Another problem is that the teacher viewing a tape of his or her classroom is viewing a different stimulus environment than the one they encountered in actually teaching the class. This is true for two reasons. First, there is a general consensus that human memory involves at least constructive and probably reconstructive processes: constructive in the sense that what is stored in memory is not a direct picture or representation of the perceived environment, but a representation constructed on the basis of prior knowledge and a selective processing of information; reconstructive in the sense that the constructed representation continues to be modified by the on-going processing of information about the target event or situation (Loftus, 1979; Beaugrande, 1981). Thus what the teacher sees at the end of the day on the videotape is an event about which teachers possess schemata or

interpretive frameworks quite different from the ones they possessed as the class progressed. The second reason the videotape stimulus is different than the one originally encountered by the teacher is obvious: The film is shot from a different part of the room. Joyce (1978-79) notes, for example, that teachers in the South Bay study frequently commented that they were seeing things on the tape that they had not seen in class. TBS experience bears this out.

Bias in Questioning

There are a number of problems and ambiguities arising from the kinds of questioning strategies used in stimulated recall interviews. It is a commonplace that the kinds of questions one asks in an interview will influence not only the content of responses to particular questions, but the interviewee's assumptions about the nature and goals of the interview. In spite of this, questioning strategies in stimulated recall interviews have received little attention--indeed, except in those cases where structured interview schedules were used, there is little information about what interviews are about or how they are conducted. This raises serious questions about such common practices as performing content analyses on stimulated recall protocols: What is the significance of the finding that around half of teachers' comments focus on students (Clark & Peterson, in press) if the very real possibility exists that the questions addressed to the teachers focused primarily on students and teacher-student interactions (examine the structured interview schedules from Peterson & Clark, 1978 and McNair, 1978-79, quoted above). The implicit biases of researchers are also a problem when no interview schedule is used. Munby (1982a, pp. 210-213) has raised reasonable questions about the possibility that researchers' category systems and leading questions may bias the content of stimulated recall interviews. Judgment on

this issue is impossible without a close analysis of interview transcripts. However, the issue is not really about bias per se -- it is perfectly legitimate for the researcher to focus the teachers' attention on issues important to the research -- but instead manipulations of the data based on assumptions that bias does not exist. The views that teachers express about students in stimulated recalls are enlightening, but it is not at all clear that one can count the frequency with which such views are expressed and use that as a measure of what is salient or important to the teacher in the course of classroom interaction. Additional problems are caused by the implicit assumption in much stimulated recall research that teachers share researchers' definitions of the interview task (Munby, 1982a). One may ask teachers to stop the tape and comment when they see themselves making "specific decisions," but, aside from the problem of whether they could possibly have this introspective knowledge, there is no assurance that they define or understand "decision" in the same way as the researcher or that their verbal reports of decisions will manifest themselves in unambiguously interpretable surface structures (cf. MacKay & Marland, 1978, pp. 10-11). Again, these comments should in no way be taken as slighting the value of stimulated recall data. The point is simply that there are limits on what one can do with the data. Such practices as counting the number of times teachers say they are making decisions and concluding on this basis that teachers make decisions with such and such a frequency seem dubious enterprises.

Context and Task Demands

The descriptions given above of the different formats employed in stimulated recall interviews should make it clear that the teachers were studied in an enormous range of task situations: Subject matter, time of year, ability level of students, grade level, school environment, familiarity with students, lesson length, and so on, all varied within and across studies.

Given the likely importance of task demands on "interactive" thinking (a subject reviewed elsewhere in this report) the lack of attention to these demands makes the aggregation of findings across studies extremely treacherous. The generalizability of any single study is also ambiguous. Conners (1978), who was more attentive to task demands than many of the other researchers, was still forced to conclude that:

> The principal limitation of the study refers to the non-standardization of the variables involved in the teacher's task-environment. The variations in the specific objectives of the lessons, the content and experiences involved, the length of the lessons, and classroom organizational patterns, militate against the generalizability of the results from the study. (p. 67)

Thus, closer attention must be paid to contextual variables and possible variations in beliefs linked to them.

Research on "Interactive" Thought Processes

The aim of the preceding section has been to clarify rather than to diminish the importance of stimulated recall data. Such data reveal a great deal about the ways teachers perceive and explain their classroom actions, and about the characteristics of the classroom that are salient to them — at least in retrospect. This information is of enormous value for a study of teachers' subjectively reasonable beliefs about the causes and consequences of their actions. The data are also valuable indications of the ways teachers think interactively, although interpretation is difficult and must be undertaken with care. As the findings from such studies have been summarized in a number of publications recently (e.g., Brophy, 1984; Clark & Peterson, in press) this review will focus on two types of models or conceptual frameworks that have been developed to account for teachers' interactive thoughts, specifically, an information processing model (Doyle, 1979) and a decision-making model (Shavelson & Stern, 1981). These models build on empirical

research and provide insight into the kinds of processes that may be important in interactive thinking.

An Information Processing Model

Doyle (1979) looks at teacher interactive thinking in terms of its role in successful classroom management, or more exactly, in the teacher's acquisition and maintenance of student cooperation (which Doyle sees as the teacher's preeminent classroom task). Doyle argues that an important aspect of the teacher's job in acquiring cooperation from students involves continually monitoring student behavior and the flow of classroom interaction. To accomplish this, the teacher must process information on many different levels simultaneously. Since people have limitations on their processing capacities, some automatization of processing is required:

> Automaticity refers to a state in which action sequences that have been mastered become unitized and are activated automatically... Although initially under conscious control, automatized action sequences are eventually activated and performed (that is, implemented with appropriate timing) without focal attention. In bypassing conscious processing, automaticity provides for a considerable savings in the amount of attention that must be allocated to coping with ongoing performance demands in navigating a complex environment (p. 60).

The automatization of some monitoring and action processes allows the teacher to distribute his or her limited cognitive resources to the processing of cues which offer crucial information about the present state and future course of classroom events.

> Since consciousness has a limited capacity, allocation of focal attention is critical to implementation of an activity. If the wrong information is processed, then appropriate adjustments cannot be made. Experience in an environment can increase the speed and accuracy of conscious processing by programming or tuning attention to those cues that provide maximal information for accomplishing a task. A person usually becomes more proficient in attending to relevant and in ignoring irrelevant cues (p. 59).

It follows that a key to successfully monitoring classroom activity (and thus managing the classroom effectively) is the formation of a framework for

conceptualizing the classroom that accentuates its relevant features and generates expectations about the probability of certain kinds of events taking place. Doyle speaks of this in terms of schema theory (see Rumelhart, 1980):

> Through such concept-formation processes as chunking and differentiation, discrete elements of the classroom environment are grouped into units, and units are categorized and labeled. Grouping and classifying encompass not only people but also events and objects within and impinging upon the classroom. At the same time, these units of environmental experience are ordered by means of a network or schema that reflects the event structure of the classroom. A schema maps, in other words, the relationships among events and the probabilities of likely and unlikely occurrences. Once formulated, a classroom schema enables a teacher to understand the environment, that is, to recognize and interpret events and novel instances and predict possible states and directions of activity. A knowledgeable teacher can, therefore, manage a classroom with a minimum of information cues. Without this understanding, a classroom remains a mass of confusion and complexity (pp. 63-64).

Classroom information processing can thus be viewed in terms of teachers confronting the classroom with schemata which organize the environment, highlighting particular features that -- because of their complexity, unpredictability, or probability of presenting impediments to the teacher -- require controlled, focused attention. At the same time, the teacher continues to process other sources of classroom information automatically. Conscious attention can be shifted to these non-focal areas if schema-based expectations are violated beyond a certain point.

Doyle's framework generates a number of useful questions -- what for example, are the objects of the teachers' focal attention (Doyle suggests that teachers may focus on "steering groups" of students most likely to misbehave or require attention)? How do these change from one classroom activity to the next? The framework is also useful for analyzing general features of the classroom environment (e.g., the idea that routinization of activities can be seen as a way in which teachers seek to reduce the demands on their conscious attention). The now widespread notion of thinking of teachers' classroom

knowledge in terms of "schemas" is also valuable, although it is not clear that one should expect to find teachers with "a classroom schema" -- rather, they may have sets of schemata for different aspects of the classroom environment.

The Shavelson and Stern Model of Interactive Decision-making

The model of teacher interactive thinking proposed by Shavelson and Stern (1981) resembles that of Doyle in several respects. Teachers' knowledge of the classroom is stored in schemas or "scripts," the classroom is monitored for discrepancies in expected student behavior, and so on. They differ, however, on how the teachers' schemata are conceptualized. For Doyle, the teachers' knowledge of the classroom is knowledge about a wide range of possible variables: the propensities of certain sorts of students to misbehave, the sorts of difficulties that might arise during particular sorts of activities, and so on. Classroom knowledge is thus something that guides teacher planning. Shavelson and Stern have a slightly different emphasis. Teachers plans -- in the form of "instructional tasks" composed of content, materials, and activities -- form the schemas or scripts that guide teachers' interactive thinking. These plans are implemented as "routines" -- sequences of action bound by strict co-occurrence rules. Shavelson and Stern state their model in the following way:

> Teachers' interactive teaching may be characterized as carrying out well-established routines. In carrying out the routine, the teacher monitors the classroom, seeking cues, such as student participation, for determining whether the routine is proceeding as planned. This monitoring is probably automatic as long as the cues are within an acceptable tolerance. However, if the teacher judges the cues to be outside tolerance (e.g., student out-of-seat behavior during discussion), the teacher has to decide if immediate action is called for. If so, the teacher has to decide if a routine is available for handling the problem. The teacher may take action based on a routine developed from previous experiences. If no routine is available, the teacher reacts spontaneously and then continues the teaching routine. If an immediate action is not called for, the teacher considers whether delayed action, say after the lesson or in future planning, is necessary. The teacher stores the action in

> memory and carries on his or her teaching routine. If no action is necessary, the teacher decides whether or not to retain the information and continues with his/her teaching routine (pp. 483-484).

The Shavelson and Stern model provides two useful guiding hypotheses. The first hypothesis is that instructional plans themselves serve as schemas or scripts guiding the teachers' processing of information and as routines guiding teacher actions. The second hypothesis is that teacher decision making (in the form of selections among routines) takes place when student misbehavior exceeds a certain tolerance point. However, the model also presents certain problems. First, unlike Doyle (1979), Shavelson & Stern (1981) have no place in their model for the distribution of focused or controlled attention. Since they conceive of schemas as instructional routines, the only expectations that could focus teacher attention would derive from some sort of difficulties inherent in these routines (in contrast, Doyle's notion of classroom schemas can include expectations about such things as student groups most likely to present behavior problems). Thus, in the Shavelson and Stern model, the teacher is depicted as monitoring the classroom in a diffuse manner for cues that interfere with the progress of the routine. It is not clear how such factors as teacher experience and general knowledge of the classroom environment fit in the model.

A second problem with the model derives from its generality. Formalization and generality can be strengths of models, but this strength is drained away if too many of the crucial aspects of the model are explained away as "black box" processes. What, for example, is a "tolerance level" or "threshold" at which student behavior is seen as requiring a response or decision? What is a "spontaneous reaction"? What determines whether immediate action is called for? Curiously, Shavelson and Stern ignore the suggestion of Morine-Dershimer (1978-79b) that actions are postponed when

discrepancies between the teacher's classroom plan and classroom reality are pervasive (although they quote the relevant passage from Morine-Dershimer immediately before describing their model). Finally, two fundamental boxes in the model are left without clear specification: "cues" and "decisions". As Clark & Peterson (in press) point out, Shavelson and Stern seem to imply that student behaviors are the only relevant cues determining whether or not teachers make decisions -- but this is not entirely borne out by the available research (pp. 57-63). Moreover, as argued above, the model does not allow for a specification of how controlled attention is distributed by the teacher -- how the "relevance" of actions is determined. The key notion of "decision" is ambiguous. Earlier in their paper Shavelson & Stern (1981) had advanced the assumption that decision making was conscious or deliberative: The teacher perceives a choice situation, weighs alternative courses of action with specifiable outcomes, assigns a preference-ordering ranking the likely consequences in terms of some desideratum, and selects a course of action which optimizes this outcome (see pp. 471-472).

The difficulties with this sort of model are well known (see March & Olsen, 1976; March & Simon, 1958). First, goals or desiderata may be multiple and conflicting, or simply ambiguous (Shavelson & Stern, p. 471, note this possibility in a footnote, but stated that they plan to ignore it). Second, it may be difficult or impossible to link actions with consequences. Third, even if such linkages are possible, it may not be possible to assign a preference ordering in terms of one's goals (assuming these are known and are not inconsistent with each other). Finally, given these problems, attempts to optimize may entail more risks and uncertainties than the teacher can accept: The result is "satisficing" rather than optimizing (March & Simon, 1958). One possible outcome of such situations is that "decisions" and their "antecedents" may be only remotely linked or not linked at all. A classroom

incident may serve as an "opportunity point" at which a teacher introduces some activity, procedure, or information not necessarily linked to the incident which precedes it (Cohen, March & Olsen, 1972). Clark & Peterson (in press) seem to acknowledge this point when they assert that:

> A model of teacher interactive decision making should reflect the definition of interactive decision making as a deliberative choice to implement a specific action rather than a choice of actions from several possible alternatives (p. 62).

However, this conceptualization still assumes that there exist "antecedents" which produce decisions -- sort of a "spasmodic" theory of teaching in which teachers plod about on automatic pilot until some environmental perturbation sets off a decision.

There is yet one final way in which the notion of a "decision" is ambiguous. This has to do with the definition of the time or point at which a decision is made. Several studies have noted that there may be considerable gaps of time between the point at which a teacher states he or she is making a decision and the point when this decision manifests itself in action (Morine-Dershimer, 1978-79b; Sutcliffe & Witfield, 1979). But in teacher thinking research the operational definition of a "decision" has almost always been "something that the teacher says is a decision in a stimulated recall interview, or something the researcher infers is a decision on the basis of something the teacher says in a stimulated recall interview." If a teacher "decides" the night before a lesson (or two weeks before, for that matter) to present the lesson in a certain fashion, this will not be considered a decision. What is defined as teacher decision making is thus in some sense an epiphemomenon of the research methodology. It is true that the research is presented only as research on "interactive" decision making, but there is no clear explanation of or argument for the idea that "interactive" decision making is worth studying in isolation from other forms of decision making.

Indeed, to do so may obscure important relationships. For example, the relative absence of "interactive decisions" about content or subject matter is sometimes taken as an indication that teachers think relatively little about such things (e.g. Brophy, 1984). However, curriculum may be a highly established and predictable environment, and a teacher teaching the same content over a number of years would be reasonably expected to have automatized an enormous number of decisions about this content.

This discussion of methods and models in the study of teacher thinking in the classroom has stressed the difficult and ambiguous nature of the enterprise. The conclusion to be drawn is not that such research is impossible or not worth doing, but that methods and theoretical assumptions must be closely scrutinized. Most importantly, the linkages between beliefs or thoughts and contextual constraints must be attended to more closely. The nature of such contextual constraints are examined in the next section of this report.

PART III: THE CONTEXTS OF TEACHING

Although context is often acknowledged as a potentially important influence on teacher thinking, teacher thinking research has focused little attention on psychological or sociological characteristics which differentiate teachers or the contexts in which they work. The aim of the research seems to be the identification of underlying patterns or commonalities in the beliefs of teachers as a group, rather than the identification of differences in the beliefs and thoughts of different sorts of teachers in different sorts of contexts, or the identification of the processes that differentiate teachers. However, an important component of an intentionalist account of teaching is the assumption that teachers are a heterogeneous group: differentiated in terms of their beliefs, skills, and the types of task environments they encounter at work. The goals of the research are thus twofold: to explore the ways in which differences among teachers (especially their belief systems) affect their performances, and to explore how their contexts of work affect their performances. These two lines of investigation must be integrated ultimately to present an account of how differences among teachers interact with differences in the task environment to produce specific patterns of practice within the classroom. A preliminary step in this agenda is an examination of contextual or task characteristics of teaching. As Cole and Means (1981) suggest:

> It is impossible to understand the differences between people that lead to different performances without first understanding the component processes of the task [or tasks] eliciting those performances. (pp. 32-33)

In this section of the report, research and theories on the teaching context are examined. The section begins by focusing on certain aspects of context which are neglected in most teacher thinking research: the community and organizational environments in which teachers work. The section then

concludes with a review of one aspect of the teaching context that has received considerable attention: the classroom.

Community and Organizational Characteristics of the Teaching Context

Community and organizational influences on teaching are difficult to distinguish from one another. Community influences often affect teachers via organizational mediation, while organizational structure is often influenced by community resources and political processes. In what follows, then, some overlap is to be expected.

Community Influences

Teachers' beliefs and actions in the classroom may be influenced by the nature of the clientele they serve: the social and economic groups from which the students and their parents come. One striking example of this can be found in Anyon's (1981) study of five elementary schools in two school districts. Anyon found systematic differences in the types of curricular materials, teacher expectations, and pedagogical methods that seemed to be related to the social class composition of the student clientele. In two working class schools, Anyon found that classroom activities were highly routinized. In math classes:

> Mathematical knowledge was often restricted to the procedures or steps to be followed in order to add, subtract, multiply, or divide...A large portion of what the children were asked to carry out [was] procedures, the purposes of which were often unexplained, and which were seemingly unconnected to thought processes or decision making of their own (Anyon, 1981, pp. 7-8).

In social studies classes, "instruction commonly involved carrying out tasks such as copying teachers' notes, answering textbook questions, or coloring and assembling paper cutouts" (p.9).

In a school serving a middle class clientele, Anyon found more flexibility in the teaching of math. Different procedures for working the same problem were explored; children were not simply given procedures to

follow by rote -- the different steps were explained and students were asked to explain how they had worked problems (pp. 13-14). With regard to social studies:

> Social studies knowledge in this school was more "conceptual" than in the working-class schools in that there was less emphasis on retention of facts and development of simple "skills" and more emphasis on children's understanding of the generalizations and other content of the books. (Anyon, 1981, p. 14)

Anyon also studied two schools serving the children of "professional" and "elite" parents and found that the children were presented with increasingly complex texts and were required to perform more complex cognitive operations than in the middle class school.

Anyon's study can be faulted on methodological grounds: her observations were not systematic enough to allow a thorough analysis of the academic task demands of the different schools. Her attempt to explain the differences she observed -- basically through a sort of economic determinism -- is also strained and unconvincing. Thus, while the differences she describes -- and their apparent close linkages to the social class composition of the school population -- are intriguing, the questions of how these differences and linkages came about remain to be answered.

There is research which addresses these questions. Sieber (1978), in a study of three inner-city elementary schools, showed that pressure exerted by community groups organized along ethnic, religious, and class lines might have considerable influence on both the curricular and pedagogical practices of schools. Collins and Noblit (1978) described a case in which community pressures became linked with factional politics within a school and ultimately resulted in changes in school practice. More recently, such issues as community influences on textbook adoption have received considerable attention (see e.g., Hillocks, 1978).

A case could be made that the sorts of direct pressure group influences on schools described above are exceptions to the rule. The community dynamics described by Sieber probably would not be found outside of older urban centers, and Collins and Noblit were studying the beginnings of desegregation in a large Southern city. However, this sort of direct pressure is not the only manner in which community characteristics may influence school practice.

First, a number of studies have suggested that in situations where teachers come from ethnic or social class backgrounds very different from those of their students, patterns of systematic misinterpretation may develop. What seems rational and appropriate behavior to the students (within the definitions of their communities) is interpreted quite differently -- perhaps in a negative fashion -- by the teacher (see, e.g., Phillips, 1972; McDermott, 1974).

Second, parents may inculcate in their children attitudes that devalue the importance of education (see Ogbu, 1974, who notes that in the case he studied these attitudes may have accurately reflected a low level of returns from education). Parental attitudes may also influence students' attitudes towards specific subject matter areas (Wilhelm & Brooks, 1980), while culturally-specific styles of communication may present students with unique difficulties when confronted with a standardized curricular or pedagogical format (Au, 1981; Scollon & Scollon, 1979). Community norms of behavior (perhaps linked to class-specific styles of socialization) may also produce students predisposed to actively resist schooling (Willis, 1981).

Finally, in situations where teachers and students derive from different ethnic or social class backgrounds, and teachers have no means for obtaining objective knowledge of their clientele, stereotypes may produce patterns of

expectations resulting in differential treatments of different types of students (Wilcox, 1982; Nespor, 1983).

All of the factors described above may form components of the context or task system in which teachers work. It is important to note, however, that the importance of community or parental influences, and the elaborateness and specificity of teachers' views of community norms and expectations, may vary greatly from setting to setting. The TBS data, for example, show striking differences across schools and within schools in teachers' knowledge of, attitudes towards, and feelings of being influenced by, community factors. One important goal of the research is thus to explore how and why community influences are differentially experienced by different groups of teachers.

Organizational Characteristics

Teachers are workers in complex organizations. The locus of the teachers' activities is the classroom, but many organizational forces may structure the classroom environment and influence the ways teachers conceptualize it. We examine five organizational factors which, from the TBS research and reviews of the literature, seem to have some salience for teachers' classroom beliefs and actions: the grade level being taught; the class period being taught; the ability grouping of students; constraints on access to information sources; and administrative or supervisory influences.

Grade Level. Teacher thinking research tends to ignore differences in classroom organization and teacher beliefs that might be linked to the grade levels that teachers teach. Indeed, much of the research seems to focus on the elementary school years, neglecting junior and high school altogether (see Brophy, 1984, pp. 83-84; Clark & Peterson, in press, p. 107). There is, however, some reason to think that the nature of the task situations encountered by teachers varies with the grade level taught.

First, there is research suggesting that the characteristics of students (an important part of the task environment) change over the course of the grade levels. Some studies suggest that there are profound shifts in the emotional, social, and intellectual characteristics of students in the period from the sixth through twelfth grades (see Simmons, Rosenburg & Rosenburg, 1973; Hillyer, 1972).

Teachers teaching the higher grades must also deal with students who are increasingly knowledgable and sophisticated about school as an institution -- students whose communicative and cognitive abilities, commitments, and interests are changing. Older students may also possess much larger stores of knowledge than their younger counterparts. The high school students studied by McNeil (1981) apparently possessed enough personal knowledge of social and economic affairs to discount some of the information presented to them by their teachers. Similarly, the demands for subject matter expertise and subject matter specialization may increase as teachers teach higher grade levels, and the gaps between teacher and student knowledge may decrease.

The nature of the activities found in classrooms may also differ across grade levels. Bossert (1979), for example, speculates on differences in the characteristics of elementary and secondary classrooms:

> at the elementary level ... the child's proximal learning environment consists of a single classroom -- one that can be classified and examined in terms of its use of several basic instructional forms. In secondary schools and colleges, the organization of instruction becomes much more complex and, hence, the unit for a task analysis may not be solely the internal organization of the work groupings (classrooms). At this level, the study of activity structures might include the sequencing, interdependence, segmentation, and similarity among various work groups as well. Moreover, instructional activities themselves may exhibit more varied forms than recitation, class task, and multitask activities. For example, in high school and particularly college, lectures and group discussions probably constitute distinct forms of work; in elementary schools, however, teachers rarely lecture or let children "discuss" without continually interrupting with questions, thus imposing formats on both of these activity forms. (p. 92)

Schools of education and accrediting agencies may promote the specialization of competencies for teaching specific grade level ranges, and differences in teacher beliefs or repertoires of methods may result from these training experiences.

Finally, teachers may teach at several different grade levels in the course of their careers. The consequences of differential experiences with different grade levels for teacher beliefs is not well-studied. However, TBS data suggest that junior high teachers whose initial teaching experiences were with elementary school students or high school students may import beliefs about those students to their present positions, or may formulate their beliefs about their present circumstances in terms of the ways they differ from their initial experiences.

The Number of Class Periods Taught. Many teachers, especially in the post-elementary grades, teach four or five class periods a day. Most teacher thinking research, by contrast, looks at how the teacher deals with a single class period or single group of students (this may be a reflection of the concentration of study on elementary grades, where in many school systems the teacher deals with only one group of students over the entire day). Again, one finds an assumption of underlying commonality: what is true of the teachers' thinking for one period will be true for other periods as well. There are relatively few studies of teacher thinking which follow the teacher through the course of a segmented day, and systematically examine the teachers' interactions with different class periods. The TBS study is no exception to this, but in interviews with teachers the differences between class periods has been a constant theme: Some classes were good, some bad, some quick, others slow. The teachers incorporate knowledge of these differences into their planning, sometimes using a class period they feel

particularly comfortable with to try out new activities, sometimes focusing on a particular period as something like a "steering group," pacing their long-term plans in terms of this group or using it as a reference group with which to measure the progress of the other periods. In many cases, the teachers have different "preparations" -- sometimes two or three -- for different class periods. Sometimes these preparations are for classes dealing with entirely different subject matter areas (e.g., at the junior high level and above, some English teachers teach a foreign language or a "journalism" class as well as English). More frequently (for seven of the eight teachers studied thus far by the project), the teachers have different preparations for class periods in different ability tracks.

Tracking and Ability Grouping. One significant source of variations in the task environments faced by teachers are the ability groupings in which the students are placed -- either institutionalized groupings (tracked classes) or groupings within the classroom. Though the TBS project collected data on only one class period of the teachers studied -- and this a class period of the middle or normal track -- each school studied had a method of differentiating students by ability and placing them in tracked classes (though the tracking systems differed from school to school) and these ability groupings seem to have played important roles in shaping the teachers' beliefs.

Many of the studies on tracking proceed from quantitative orientations where the goals are to ascertain the actual determinants of track placement (e.g., the amount of variation that can be explained by ascriptive characteristics such as social class, ethnicity, etc., versus the amount of variation that can be explained by achievement scores, grades, etc., see e.g., Davis & Haller, 1981; Heyns, 1974). Other approaches have focused on the institutional "gatekeepers" responsible for making the decisions about which students will be sorted into which tracks, examining the criteria for

decision-making employed by counselors (which often vary from the "official" criteria by which selection is explained and legitimated, see, e.g., Cicourel and Kitsuse, 1963; Rosenbaum, 1976). In contrast, there are relatively few careful observational studies of the effects of tracking on the task structure of the classroom and classroom interaction. Oakes (1982) is an attempt to quantitatively analyze observational and interview data on students in different tracks, but the dynamics of classroom interaction are not treated (instead, the data is compressed into statements about such things as the frequency of student participation), and peer group socialization and association patterns were examined only through proxies such as interview questions about how one felt about one's classmates.

There are, however, several studies which suggest sharp differences in the classrooms of different tracks. Schwartz (1981) studied tracked classes at both the elementary and junior high level and found sharp and systematic differences in the behavioral strategies of the students in different tracks, in the ways students characterized each other, and in the deference behaviors of the students towards the teachers.

In Schwartz's study, lower-track students received half as many directions, and a third fewer explanations, lectures or demonstrations than high track students:

> Teachers tend to review or correct homework assignments 20 percent more with the high- than with the low-tracked students. Teachers adopt different questioning strategies with high and low tracks, also. High-track students are encouraged to volunteer, either individually or collectively, to respond to questions as often as they are called on by name. When they answer incorrectly, the teacher tends to correct them, push them until they obtain the correct answer, or indicate that they are wrong and question someone else. By contrast, low track students are rarely asked to volunteer. Instead they are questioned by name. Often teachers announce that they want to see who is misbehaving or is inattentive and direct questions to those students. (Schwartz,1981, pp. 112-113)

Schwartz also found systematic differences in the types of behaviors for which students of different tracks were sanctioned, as well as different types of sanctions for the two tracks.

Metz's (1978) findings, in a study of junior high classrooms, were similar to those of Schwartz. The same teachers taught different tracks differently: more discussion with the higher tracks, and more worksheet and seat work for the lower tracks (Metz, 1978, pp. 101-103). Students from high and low tracks engaged in different forms of misbehavior, the high track students challenging the teacher on academic issues, the low-track students on non-academic grounds:

> In the top tracks a teacher could therefore keep his focus in the academic realm even when he was in serious conflict with a student. The conflicts were not consequently easy to handle. On the contrary, the students often chose academic ground for their battles because it was very difficult for a teacher to pin down punishable actions. The students would spend considerable energy plotting strategy and weaving traps into which an unwary teacher could easily fall. (Metz, 1978 p. 107)

In contrast, in the lower tracks, student misbehaviors were likely to be non-academic and much more potentially disruptive. As a result:

> In practice, if not in intent, the teachers engage in exchange with the lower level classes. The teacher permits inattention to the academic task and minor breaches of classroom etiquette in exchange for the students' willingness to refrain from really disruptive noisy activity or over angry attack upon the teacher. (Metz, 1978, p. 109)

Rosenbaum's (1976) study of tracking in a high school shows similar differential treatments of high and low tracks.

What emerges from these studies is a picture of tracking effects as outcomes of an interactive, recursive process in which students' abilities, institutional categorization processes, teacher expectations, and styles of peer group association produce significantly different target systems in classes of different tracks:

> Teacher expectations and behavior may initially shape students' values and modes of interaction ... However, once high- and low-track peer groups' educational orientations emerge, they in turn perpetuate the perceptions that generate them in the first place. Eventually, teachers and student alike interact in a mutually reinforcing and circular network of institutional expectations and behavior... (Schwartz, 1981, p. 109; see also Hargreaves, 1967; Lacey, 1970)

The emphasis here is on "institutional expectations": organizational differentiating mechanisms which promote particular patterns of belief and expectations among both students and teachers. Indeed, Rosenbaum (1976) argues that these organizational analogues to beliefs are necessary situational aspects of the "self-fulfilling prophecy" process.

However, ability grouping may occur even in the absence of organizational analogues. Teachers may segment their students by ability and deal with students from different groups in strikingly different ways (see Cazden, 1981; Green, 1982, pp. 208-210 for summaries of a number of studies with this finding). Thus, even when there are no specific institutional supports, the groups of students with different characteristics may be seen by teachers as constituting different task environments:

> Griffin (1981) suggests that the differences in approaches to high, middle, and low students may be due to differing theories about what each group of students needs ... rather than a single theory of pedagogy, teachers may have different theories for different students, and, therefore, shift instruction according to these theories. (Green, 1982, p. 186)

In sum, the organizational classification and grouping of students by ability may present teachers with different types of target systems over the course of the school day. While present TBS data address this issue only tangentially (through the self reports of teachers on the importance of ability groupings and through observations of grouping within classes) it may provide a significant issue to explore in future research.

Access to Resources and Information. Schools may vary widely in the quantity and quality of the resources they make available to teachers. Constraints on resources may take a number of forms.

1. Salaries: The issue of teacher pay has received much attention recently (Ward, 1983, pp. 17-19), but the focus of this attention has been on the salaries of teachers as a profession vis-a-vis other professions. However, salary levels may vary greatly from school district to school district, contributing to high staff turnover and teachers taking additional jobs in low-paying districts (as in one of the site schools of the TBS project). Salaries may thus have some impact on the kinds of teachers that teach in a given district, and the continuity of teaching staffs in thoses districts.

2. Physical Plant and Material: The quality of the physical plant of a school and the ease with which teachers can obtain materials needed for thier classrooms are again tied to the finanacial resources of the school district. Some schools are cramped and poorly maintained, others spacious and well-endowed. In two of the schools studied by the TBS program teachers were unable to work in their classrooms during their conference periods because space constraints required that classes be taught in them during those periods (at one school there was a teacher with no permanent classroom). Materials may also be in short supply: In one school teachers received $40.00 a year for supplies and were forced to write some of their tests and assignments on the blackboard because of a chronic paper shortage. Such matters may have a significant influence on what happens in classrooms.

3. Access to Resource Personnel: Districts and schools may differ in the number of resource specialists they provide for teachers. One of the districts studied by the TBS program had no curriculum coordinator, a second district had one coordinator for the entire curriculum, which the third had

curriculum corrdinators for each subject matter area. Similarly, the number and quality of in-service training sessions provided by the district varied greatly: from nothing at all to a profusion of varied offerings. The number of bilingual, remedial, and counseling specialists also varied from district to district. According to the teachers, such factors had a considerable impact on their teaching.

4. Time: The amount of time teachers have to themselves outside the classroom my vary greatly from district to district. Some of this disparity may be direct and obvious -- as in those more affluent districts which may provide teachers with more than one conference period. However, time constraints may be less apparent but just as dearly felt in those districts where teachers are required to supervise playgrounds during lunch periods and to monitor students as they board busses before and after school. Finally, schools may vary in the amount of time they allow teachers with students: In the TBS study class times ranged from 45 minutes to 55 minutes in length.

Each of the factors described above contribute to an ecology of the school. Their effects on teachers' beliefs and practices may not be direct, but they may constitute important constraints on the types of beliefs thay may emerge in a given school and at the same time frame or shape the environments of classrooms.

Administrative or Supervisory Influences. Classrooms can be viewed as organizations unto themselves, task environments with their own unique demands on teachers. But at the same time, teachers are workers in the complex organization of the school, and the characteristics of this environment may have significant influences on the beliefs and styles of actions that characterize teachers in a particular school.

The differentiation of schools may have as one of its sources the policies of hiring. Particular types of teachers may be hired because of particular qualities and beliefs they possess. In the small TBS sample of teachers a wide range of hiring criteria were reported: from football coaching ability as a requisite ability for teaching history, to commitments to certain forms of disciplinary procedures or ideologies; to not clear criteria aside from the proper certification.

The systems by which teachers are monitored and evaluated by administrators may have important consequences for teachers' feelings of satisfaction and sense of individual efficacy (Darling-Hammond, Wise, and Pease, 1983; Fuller, Wood, Rapoport and Dornbusch, 1982). Studies have also suggested that the principal may play an important role in the formation of teachers' beliefs (Winfield, 1983), in addition to the well known finding of the principal's overall influence on the effectiveness of schools (Brookover, 1977).

Finally, school organizations place management constraints on teachers which may have considerable influence on their actions if not their beliefs. One obvious example of this is the requirement that teachers evaluate their students: that they give grades. In two of the TBS site schools teachers noted administrative requirements on the number of grades that the teacher much give students (which sometimes led to the teachers instituting pseudotasks designed merely to generate grades for their grade books) and reported being monitored for the distrigution of grades (not too many "As" or "Fs").

The aspects of community and school organization reviewed in this section can be seen has having a potential impact on how teaching takes place in a given school. The following section examines some general frameworks for considering the immediate task environment of the teacher: the classroom.

The Classroom Context

Previous sections have discussed how factors beyond the individual classroom may constitute target systems influencing teachers' thoughts and actions. However, it is the classroom itself which must be the focus of attention in formulating a conceptual model of the teachers' target system. The classroom is the place where teachers spend most of their time and expend most of their energy, and the primary importance of outside influences lies in the ways they structure the classroom setting and influence the teachers' perceptions of and actions in that setting. This section is a preliminary attempt to examine frameworks which portray the classroom as a task environment.

Four frameworks for looking at the contextual constraints of the classroom are examined. The first portrays the classroom using terms similar to those used in analyzing the industrial workplace (Bossert, 1979). A second framework depicts the classroom in terms of its social-interaction task demands. Erickson (1982) is used as an example of this approach. A third approach, exemplified by Doyle (1979), borrows from ecological analyses of the classroom and cognitive psychology to describe the classroom setting in terms of its information processing demands on the teacher. Finally, a sociological approach which emphasized the interaction of teacher commitment and contextual constraints in defining teachers' tasks and strategies for dealing with these tasks is considered. Woods (1979) will be taken as an example of this position.

Task Structure as a System of Control. Bossert (1979) argues that social interaction is structured by the nature of the task or activity structures that people engage in.

> To the extent that classrooms employ different activity structures, different interaction patterns should emerge. This view differs

> from the usual highly individualistic conceptions of classroom processes in which characteristics of individuals are seen as the primary determiners of behavior, and instead focuses on the social organization of the learning environment as a frame for emerging social interaction. (Bossert, 1979, p. 1)

Bossert's (1979) usage of the terms "activity" and "task" is somewhat ambiguous, but he seems to argue that activities are structures that can be decomposed into component task activities:

> Every classroom activity...can be described in terms of its tasks characteristics. Just as in the analysis of industrial work tasks, classroom task activities vary in the size of the work group (from single pupil to the whole class), the division of labor, that is, the number of different tasks being completed during the same period (from single task for the entire class to individualized instruction) and the interdependence of task performance, and the degree of pupil choice (or teacher domination) over the task (from total specification by the teacher to full pupil choice). (p. 10)

Bossert also adds another important dimension to classroom tasks: they ways in which pupils' performances in the classroom are evaluated.

These task characteristics, Bossert argues, play important roles in determining social relationships in the classroom. In particular, Bossert suggests that they influence: a) methods of teacher control (e.g., types and frequency of desists); b) the ways in which rules and norms are established in the classroom -- and the nature of these rules and norms; c) the ways teachers conceptualize pupils' identities and needs, and the ways teachers meet these needs; and d) the ways pupils interact with each other, and who interacts with whom. The nature of competition and cooperation among pupils is also thought to be affected (Bossert, 1979, pp. 10-13).

Bossert claims to have found "three distinctive patterns of classroom task organization." Before these are summarized it must be noted that the patterns Bossert describes are ideal types. In real situations there will almost certainly be variations and deviations from the models he describes. Furthermore, Bossert can only describe classrooms in terms of their "dominant" task patterns. The teachers he observed used all three task

structures in their classrooms. Bossert was thus forced to quantify the amount of classroom time spent in each task pattern and to label the pattern that occupied the plurality of time as the dominant pattern. This point should be taken into account when considering Bossert's statements about the implications of the various task styles.

"Recitation," the first pattern of task organization that Bossert (1979) describes,

> is an activity that involves the whole class or a large group of children in a single task: the children listen to the question the teacher asks, raise their hands, wait to be recognized, and give an answer. Occasionally, children can ask questions when they do not understand the question or the materials, though the teacher usually controls the flow of questions and answers. During recitation, a child's performance is very public. Both the teacher and fellow pupils know when an answer is correct or incorrect. When the response is correct, the teacher usually praises the child, and when the response is incorrect, the teacher either corrects it or asks the same question of another pupil. Because of this, class members have fairly good idea of how others are performing. Because the task and curriculum are the same for every pupil, performance can be easily compared. (p. 44)

Bossert (1979) found that this pattern of task organization strongly influenced the teacher's style of classroom management and the way the teacher regulated pupils' classroom participation.

> During recitation, all four of the teacher displayed relatively high desist rates and used impartial and impersonal means of controlling pupils. These qualities are constitutive elements of the work organization of recitation, which creates a group management situation in which teacher and pupil behavior is public and pupil attention is necessary for the smooth operation of the task. Because recitation places the teacher at the center of instruction, he is able to observe most misbehavior and tends to rely on quick commands to sanction it. If a teacher attempts to treat a child individually during recitation, he may lose control of the entire class, waste instructional time, and violate demands of neutrality...
>
> The teachers who predominantly used recitation relied on their top performers to contribute during recitations and served as models for the rest of the class. These pupils received the most individual assistance ... The development of an academic hierarchy [among the pupils] only occurred in the recitation-organized classrooms, where the single task structure and comparative assessments of performance allowed for classroom ranking by

achievement. This was shaped by the teachers' allocation of instructional assistance. (pp. 89-90)

Bossert labeled his second pattern of task organization "class task." This is described as:

> work sheets, tests, math assignments, or other tasks assigned to the entire class fit into this category ... usually ... the teacher assigns a common task for every pupil to complete. Performance on class task activities is less public than in recitation. Because the task are done independently or in small groups, neither all class members nor the teacher can constantly observe each other while they are working, though pupils' performances are comparable due to the common task. (Bossert, 1979, p. 44)

Classrooms where class tasks dominate are treated as intermediate cases between recitation-dominant classrooms at one extreme, and "multitask" dominant classrooms at the opposite extreme. The "multitask" pattern of task organization:

> usually includes tasks like independent reading, small group and independent projects, artwork, and crafts. These activities involve the greatest amount of pupil choice in organizing and completing the work. Like class tasks, multitask activities involve independent or small group work. The distinctive characteristic of multitask settings, however, is that many different tasks are being worked on simultaneously. Because the class is involved in a variety of task activities, the teacher and children are rarely able to observe the task performance of every pupil. Furthermore, pupils' performances cannot be compared except among those children doing the same tasks. (Bossert, 1979, pp. 44-45)

The structure of classroom control and participation stemming from multitask organization differs markedly from that which follows from recitation organization:

> During multitask-organized activities ... the teacher need not control the entire class at once. Because the children are separated into smaller groups or are working alone, the teacher need only monitor pupil behavior periodically. If misconduct occurs, it is not likely to be contagious as few fellow pupils are able to observe such acts. This decreased visibility also allows the teacher to exercise more personalistic means of control over misbehavior: there are fewer demands of equity and more time to handle problems on an individual basis...
>
> ... Although all four teachers indicated that they provided the most assistance to pupils having the most difficulty, the teachers in the multitask classrooms were the only ones for whom this was true ... In the multitask classrooms ... there were few common

> tasks for the entire class; hence none of the children could become standards for the task activities. Pupils who did excel in a particular task were expected to help others or to work independently, leaving the teacher free to assist those pupils having the most difficulty. (Bossert, 1979, pp. 89-90)

Bossert's framework introduces some important issues, especially those about the relationships between classroom activities, teachers' control strategies, and patterns of pupil interaction and participation. However, there are also a number of specific problems with the analysis framework. For example, Bossert pays little attention to the content of classroom activities and the possible linkages between patterns of task organization and specific bodies of subject matter. For example, are certain forms of task organization more likely to be used with certain types of lessons as opposed to others? Bossert also has little to say about the quality of instruction. Classroom tasks are not standardized assembly line processes and one teacher's conduct of a "recitation" may differ from that of another teacher. There is also some ambiguity in the process of determining when a pattern of task organization is "dominant." Is 30% of class time sufficient to establish a task pattern as dominant? 40%? How much? Finally, 20% to 30% of the time in the classes Bossert studied did not fit into any of his three major categories of task organization (Bossert categorizes this as "free time" or "administrative paperwork time"). Is this time simply irrelevant?

There are also a number of more fundamental questions about task organization that are not addressed in Bossert's analysis. Where do tasks and activity structures come from? To what extent are they the results of conscious decisions by the teachers? To what extent are they the products of administrative or community pressures? To what extent are they implied or constrained by the materials used in the classrooms? By ignoring such questions, Bossert, while renouncing analyses which focus on characteristics of individuals, has in a sense merely introduced a new kind of teacher

personality characteristic: task-style. Bossert also does not address the questions of how tasks or activities are initially established, or how teachers make transitions from one pattern of task organization to another. Finally, there is no consideration of the implications of the patterns of task organization for student learning.

These problems do not completely vitiate the utility of Bossert's framework -- the task characteristics he identifies still seem useful analytic tools and might be integrated with some of the other frameworks for studying the classroom as a task system.

Tasks as the Regulation of Social Interaction. Micro-etnographic and sociolinguistic analyses of classrooms (e.g., Mehan, 1979) have attained a considerable degree of sophistication in identifying interactional regularities: the allocation and exchange of "turns," the proper negotiation of questions and answers, and so forth. On the whole, however, the emphasis in this approach has been on purely formal characteristics of classroom interaction -- how things are done -- rather than on the substance of interaction. Some of Erickson's recent work (e.g., Erickson, 1982) appears to represent a movement towards an examination of content in the classroom in addition to the study of interactional forms. For this reason, it is his work that is drawn upon in this section.

Where Bossert looked at the classroom as a work environment from the perspective of management -- how tasks are organized, monitored, evaluated and so on -- Erickson (1982) focuses on the question of how classroom work is appropriately performed. He differentiates between the "academic task structure" and the "social task structure" of the classroom. The academic task structure is defined in the following way:

> The academic task structure governs the logical sequencing of instructional "moves" by the teacher and students. Consider, for example, the following problem in addition:
>
> $$\begin{array}{r} 14 \\ +8 \\ \hline 22 \end{array}$$
>
> In solving this equation in "old math" (and in teaching the steps in its solution) it is necessary to begin (a) with the rightmost column (the "1s"); (b) add the numbers in that column; (c) since the sum of that column is greater than 10, "carry" the 10 units into the column next to the left (the "10s" column); and (d) add the two 10s in that column. The sequence of steps is constrained by the logic of computation...
>
> There are at least four definable aspects of academic task environment in a lesson: (a) the logic of subject matter sequencing; (b) the information content of the various sequential steps; (c) the "metacontent" cues towards steps and strategies for completing the task; and (d) the physical materials through which tasks and task components are manifested and with which tasks are accomplished. (Erickson, 1982, p. 154)

This is a rather elementary way of looking at academic tasks (compare Doyle, 1983). One major problem is that Erickson's definition of academic tasks is clearly modeled on the kind of math problem he uses as an example in the quote given above. This corresponds to only one of the four kinds of academic tasks Doyle (1983) identifies (a "procedural" or "routine" task). It is not difficult to imagine tasks in which sequencing is not easily identifiable or as crucial as in the addition problem. Erickson also seems to be basing his notion of an academic task on the idea that the task is composed on one problem. This may be a viable assumption in the first grade math classes Erickson was studying, but it seems reasonable to assume that in many classrooms tasks will be composed of bundles of problems possibly varying in their task demands.

Erickson's (1982) discussion of the social task structure of the classroom is much more assured:

> Paralleling the four aspects of the academic task environment of a lesson are four definable aspects of the social task environment: (a) the social gatekeeping of access to people and other information sources during the lesson; (b) the allocation of

> communicative rights and obligations among the various interactional partners in the event; (c) the sequencing and timing of successive functional "slots" in the interaction; and (d) the simultaneous actions of all those engaged in the interaction during the lesson. Taken together, these four aspects manifest the social participation structure of the lesson as a learning environment. (p. 155)

Examples of (a) would be the regulation of opportunities for students to present personal knowledge to the class; to talk to each other to get answers; to use their books to find answers (or to use books they've brought to class from the outside); to use calculators, and so on. An example of (b) would be the fact that teachers can ask certain types of questions of students (e.g., pseudoquestions) that students cannot ask of teachers. Teachers usually also possess a monopoly over the legitimate allocation of speaking rights in the classroom (see McHoul,1978) -- though this may vary in complex ways, as can be seen in the TBS data. An example of (c) would be the segmentation of classes into distinct activity sets, and the ways transitions between these are managed. (D) should be self-explanatory. One helpful metaphor that is sometimes employed is that of the teacher as orchestrator and conductor of classroom activities:

> The teacher is responsible for orchestrating the actions and events of the classroom ... classroom communication is subject to rules and expectations of conversation. Classroom events, like other communicative events, are constructed by participants as they engage in face-to-face interactions. The teacher in this process plays an asymmetrical role, since he or she is ultimately responsible for what occurs.
> Teachers not only orchestrate what occurs with the lesson of the moment, but also are responsible for orchestrating students in simultaneously occurring groups and in peer situations; that is, the teacher must monitor and orchestrate the lesson that is the primary vector of activity ... as well as those that compose the secondary vectors of activity ...
> The teacher not only presents academic content but must also orchestrate the structure of the activities, distribute turns to speak, and maintain order and flow of the activity. This work suggests that teachers must simultaneously orchestrate academic content, management, and discipline aspects of lessons ...Griffin (1981) ... suggests that teachers must also orchestrate delivery strategies of varying types. For example, if students ask for help, teachers often need to ask for additional information to provide

> the appropriate help; that is, teachers need to develop ways to get some information in order to give some information. (Green,1982, pp. 183-184)

Erickson's framework remains schematic. Nevertheless, the notion of a social task structure seems a potentially useful way of looking at the teacher's task of regulating the flow of information and participation rights in the classroom. The analytical distinction between academic and social tasks may also prove to be valuable.

Teaching as the Definition of Classroom Tasks. Doyle's (1979) work blends ecological analysis and concepts from cognitive psychology into a framework for viewing the task structure of the classroom in terms of its information processing demands on the teacher. This section of the report focuses only on the issues of how tasks are defined. Doyle's information processing model is discussed in the section of the report on interactive thinking.

Drawing on ecological approaches to the classroom, Doyle describes classroom "activities" in the following fashion:

> The concept of "activities" ... designates bounded segments of classroom time, for example, seatwork, tests, small-group discussion, lecture, recitation, reading. Activities can be described in terms of [1] the physical space in which they occur, [2] the type and number of participants, [3] the resources or props used, [4] the format for behavior, and [5] the concern or focal content of the segment (for example, art, mathematics, vocabulary). (Doyle, 1979, p. 45)

This is essentially an "etic" or objective categorization system. The notion of "tasks," by contrast, necessitates attention to "emic" categories -- the goals or motivations of the actors involved in classroom activities:

> A task is defined ... in terms of (a) a goal and (b) a set of operations designed to achieve that goal. In this sense, a task gives meaning to an activity by connecting elements within the activity to a purpose. Behavior, in turn, can be understood in terms of task accomplishment, that is, as a set of operations perceived as necessary to cope with environmental demands. (Doyle, 1979, pp. 45-6)

However, it is not clear whose goals or purposes are being considered here. Doyle seems to suggest that intrinsic features of the classroom environment define the goals or purposes of activities. At any rate, his focus is on such "formal" goals rather than on the private or personal goals of any of the individuals in the class. From this perspective, it is deduced that the teachers' overriding goal must be to get the students' cooperation:

> Teaching is conceptualized in terms of the problems posed by the classroom environment ... teachers encounter classrooms as units of time to be filled with activities that can be justified educationally and as groups of students who vary widely in aptitude and propensities for such activities. At a proximal level, then, the teacher's task as defined by these situational demands is to gain and maintain cooperation in classroom activities. (Doyle, 1979, p. 47)

Cooperation itself, however, cannot be formally defined, but is instead a product of the teacher's definition of the 'rules of the game' within the environmental constraints of the classroom. Doyle (1979) describes the concept by contrasting it to similar or related concepts:

> Cooperation is not a euphemism for compliance or control, although these latter terms may define cooperation in a particular setting. Neither is cooperation equivalent to involvement, since passivity (that is, willingness to go along with or at least not disrupt an activity) can under certain circumstances be a sufficient level of cooperation for some of the students in a classroom. Further, norms or rationality that specify appropriate classroom activities differ across settings and teachers vary in their tolerances for modes of student conduct. (p. 47)

As Doyle acknowledges, defining cooperation as the teacher's primary goal is a departure from the mainline assumptions of educational research. His rationale for this move is worth quoting at some length:

> To say that the teacher's task is to maximize learning outcomes for individual students is to define the norm of rationality for classrooms. At the same time, this definition, by focusing on outcomes, presumes that alternative courses of action can be implemented with equivalent ease. Such a view trivializes problems posed by the environment in which teachers work. The emphasis on cooperation, on the other hand, directs attention to the operations of teaching and to questions of implementation. Such questions are fundamental. If any learning is to occur from teaching, the teacher must sustain cooperation of the student in an activity. To

> ignore this is to ignore the essence of teaching. Since teaching occurs in classrooms, the teacher's task is most often one of securing the cooperation of a group. (Doyle, 1979, pp. 48-49)

The argument to this point presents certain difficulties. To describe structural constraints on action -- to say, for example, that the acquisition and maintenance of students' cooperation is the sine qua non for achieving one's ends in the classroom -- is one thing. To say that optimizing cooperation is therefore the primary goal of the teacher is quite another. To speak of tasks in terms of "goals" and actions to attain them is to invoke human consciousness and intention, and these are in some sense independent variables which cannot be simply inferred from structural constraints. It may be the case that gaining cooperation is an "objective necessity" for the teacher's classroom practice, but it does not necessarily follow that a particular teacher perceives it as such. Thus, while it is appropriate to analyze the teacher's actions in terms of their role in effectuating cooperation, teachers' beliefs, goals, and intentions may focus entirely on other issues. Finally, even if one were to assume that cooperation, as Doyle conceives it, were the primary goal of teachers, it would still be necessary to model the teachers' beliefs about this task in order to understand his or her actions with regard to it. There are many ways to deal with a complex social interactional task, and to understand the approach adopted by given individuals or groups requires an understanding of how <u>they</u> understand the task. As Hutchins (1983) puts it:

> What we want to do is not to model a theory of the task, but to model the problem solver's theory of the task. In doing this we identify the real task to be solved as an internal one. It is the set of operations required to operate on the problem solver's representation of the task, rather than the set of operations required in the world. This means that we need to look first at what the problem solver thinks the task is and then ask the question: "How could one operate on that representation to produce the decisions required to accomplish that task?" (p. 224)

These issues are important for two reasons. First, as Doyle notes, teachers' definitions of what counts as cooperation may vary -- and it may be reasonably assumed that such variations are linked to the teachers' beliefs. Second, any discussion of the information processing demands on teachers in classrooms must heavily emphasize the issues of how the teachers define relevant features of the classroom and distribute conscious attention (Doyle, 1979) -- issues which may well be linked to their theories and beliefs about the classroom context. In short, teachers' beliefs, interacting with contextual constraints, may determine a teacher's goals and guide his or her actions.

Leaving aside for the moment the issue of the importance of teacher beliefs, we can now examine a general framework for describing what teachers do in classroom. This is approached by comparing Doyle's discussion of students' behavioral tasks (Doyle, 1979) with his discussion of their "academic tasks" (Doyle, 1983).

In defining students' behavioral tasks, Doyle (1979) first posits that the classroom is a rule-governed structure:

> violation of classroom rules is viewed as a behavior task, that is, a student-initiated action involving a goal and a set of operations to achieve that goal ...
>
> Achieving the goal of a behavior task depends on the student's ability to navigate the behavior-task structure of the classroom, that is, to circumvent the enforcement system used by the teacher. Success at behavior tasks usually means that the violation is sustained for a reasonable time. In contrast to merely troublesome students, the skillful students usually "get away with" the violation. They are either not caught or are caught only after a long period of time has elapsed. (pp. 49-50)

It is not clear that only "violations" of rules are counted as behavior tasks: Presumably students may have behavioral goals that are not in violation of a classroom rule system. However, the real issue here is the status of this rule system: Is it something that can be defined independently of the teacher and the students, or is it instead to be conceived of in terms

of the reactions and sanctions imposed by teachers? The existence of explicit, even written, official rules does not resolve this issues. As the extensive literature on criminology and "deviance" shows, those who enforce the law possess an enormous amount of discretion in definition actions: The same "objective" action in the same legal system may be interpreted in completely different ways by enforcement officials (see e.g., Cicourel, 1968; Ditton, 1979; Littrell, 1980). Procedures or criteria for enforcement may shift from one point in time to another without a concomitant change in the rules or laws being enforced. Rules and laws may thus have an objective basis (but cf. Sieber, 1979, who argues that the shifting and ambiguous nature of unwritten rule systems is the key aspect of teachers' control processes in elementary classrooms). However, in practice, it is the way the teacher sanctions and rewards behavior -- the way the objective rules are invoked -- that really defines what the rules, and the behavior tasks, are.

The general point being made here is clearly reflected in Doyle's (1983) discussion of "academic tasks." Here academic tasks are seen as having an objective basis in the curricular materials with which the students must deal: "Students' academic work in school is defined by the academic tasks that are embedded in the content they encounter on a daily basis" (Doyle, 1983, p. 162).

However, it is the teachers' actions in rewarding or accepting student performances that are seen as actually defining the academic task:

> The answers a teacher actually accepts and rewards define the real task in classrooms. The announced goal of an art lesson, for example, may be to learn to analyze the effects of color on emotions, a task which at least potentially involves comprehension. If, however, the teacher rewards verbatim reproduction of definitions from the textbook, the task can be accomplished by memorizing. (Doyle, 1983, p. 182)

Thus both academic and behavioral tasks can be seen as fluid and malleable: objectively constrained but amenable to a wide range of discretionary definition and re-definition by the teacher. The teacher's task is therefore to organize the objective bases of behavioral and academic tasks (rules of behavior and curricular materials) and to present and maintain practical definitions of them (by accepting, rewarding, or rejecting and penalizing student actions and products).

The ways teachers negotiate these tasks are products of their beliefs and the contextual constraints in which they work. Neither constraints nor beliefs should be construed as necessarily prior to or determinant of the other: Beliefs may precede action (as classical decision making theory assumes) but beliefs are certainly also often the products of the actor's attempts to understand what he or she has already done (Weick, 1979). Contextual constraints may determine action, but actor's beliefs are important in the ways they define situations and beliefs, and hence the ways they perceive and react to these constraints.

Students as Context -- Teaching as the Task of Survival. The frameworks reviewed above have depicted the classroom in terms of the structure of activities, the regulation of social interaction, and the on-going definition of appropriate student performance. The classroom has been conceived in terms of such factors as behavioral rule systems, time and material resources, and the demands placed on the teacher in regulating simultaneously occuring vectors of interaction. Students are for the most part conceived of as passive actors, their goals, intentions and motivations seemingly irrelevant. They are important only insofar as there are a lot of them for the teacher to deal with at once. Frameworks which portray students as more active participants in the classroom -- indeed, as crucial elements of the classroom

context -- may lead to strikingly different conceptualizations of the tasks of teaching. One such study (Woods, 1979) will be examined here.

Woods (1979) acknowledges the importance of ecological analysis of the classroom, but argues that such analyses frequently take into account only

> rather mechanical or demographic constraints, such as rooms, desks, resources, numbers of pupils, within a general context of these other constraints. What we have to inject into this model is a more dynamic factor, namely the nature of the pupils, within the general context of these other constraints, which materially represents the pull of societal forces; together with an element of teacher creativity. (p. 149)

Woods argues that teaching is a profession which places its members under pressures from conflicting task demands. In one guise teachers are experts, transmitters of knowledge and institutional gatekeepers:

> Their area of untouchable competence is in the elaborate forms of certification and all that implies in the processing of people through these gateways...Just as doctors diagnose bodily health, vicars spiritual health or lawyers legal health, so teachers diagnose and minister to mental and personality health in the sense of fitness for job and life. They are masters of mental and personality symptoms in a way that parents, or others unconnected in any direct sense with the certification process, cannot be (Woods, 1979, p. 141).

These professional duties are not performed in a vacuum, and the bulk of Woods' book is a description of characteristics of school organization and the student clientele that militate against their successful performance:

> my analysis of the constraints on teachers portray them in the ever-tightening grip of a powerful pincer-movement, with "professional demands" on one side, and "recalcitrant material" in the form of reluctant or resentful pupils on the other, with shrinking aid or the ability to resist either (Woods, 1979, p. 141).

For Woods, the linchpin that explains teachers' actions under these constraints is the concept of "commitment." Commitment refers to the process by which individuals "invest" parts of themselves in social institutions:

> One of the major social system problems involving the commitment actors is its continuance as an action system. This involves cognitive orientations bearing on profits and costs, and generally implies commitment to a social system role. "The individual who

> maker a cognitive-continuance commitment finds that what is profitable to him is bound up with his position in the organization, is contingent on his participating in the system" (Kanter, 1974, p. 132). There is a profit in his remaining there and a deficit associated with leaving. Continuance is accompanied by "sacrifice" and "investment" processes. As a price of membership, members give up something, make sacrifices, which in turn increases commitment. So does investment, which promises future gain in the organization. The member takes out shares in the proceeds of the organization and thus has a stake in its future. He channels his expectations along the organizations's path, and the more he does so, the more he increases the distance between this and other possibilities. They grow more remote as his commitment grows larger. In this way the process is self-validating, self-reinforcing and frequently irreversible (Woods, 1979, pp. 143-144).

The demands of the "professional" role, the constraints put in the teacher's way -- primarily in the form of pupils who lack interest, motivation, and commitment to schooling -- and the teacher's commitment to the institution put pressure on the teacher to "accommodate," to find some way to continue in the institution in which they have invested in the face of intransigent problems. Woods labels these accommodative strategies "survival strategies." He identifies eight such strategies, and these are summarized briefly below.

1. Socialization: Woods argues that a primary source of the teacher's difficulties are pupils whose standards, values and beliefs differ from those of the teacher. One possible response to this situation is to try to inculcate in the students the desired attitudes and beliefs, to "socialize" them into the culture of the school. As Woods notes, this is an "anticipatory" strategy:

> It tries to fashion the pupil so that he will not cause other contingencies to arise. Thus other strategies depend upon its success or failure. Generally speaking, unless pupils are already well disposed toward the official culture, socialization programmes are just as likely to alienate us as to win over, and most of them have a hollow ring to them. Most teacher, therefore, have recourse to other methods. (Woods, 1979, p. 150).

2. Domination: Woods notes that teachers are generally bigger and stronger than the students they teach (though this would not necessarily be

true of high school, something Woods makes no qualification for. It should also be noted that some teachers may rely on the availability of a vice-principal or another teacher who can physically dominate a student where they themselves might not be able to.). In the category "domination," Woods includes physical violence (corporal punishment, or other forms of abuse -- hitting them where they won't bruise); as well as verbal abuse: threats, humiliating the student, showing extreme anger, and so on (Woods, 1979, pp. 150-153). Stebbins (1981) notes that domination:

> is a common strategy, particularly for teachers of low ability pupils. It hinges on physical force (...Becker, 1952), vocal superiority (Lacey, 1970, pp. 174-175), rigid discipline (Hargreaves, D. 1967, pp. 103-4; Gouldner, 1978, pp.30-31), establishing rules (Delamont, 1976b, pp. 94-99; Hammersley, 1976, p. 110), continuous surveillance (King, 1978, p. 51; McPherson, 1972, p. 89), 'showing them up' (Woods, 1975), and so on. (p. 248)

3. Negotiation: This is a process in which the teacher gives up something -- academic standards, strict adherence to rules (provided these are not rules absolutely crucial to the teacher's maintenance or order in the classroom) -- in return for some sort of minimal cooperation from the student (s). The teacher "satisfices" instead of attempting to "optimize."

> The principle of this strategy is exchange. Commonly used are appeals, apologies, cajolery, flattery, promises, bribes, exchanges and threats...Often the commodity the teacher offers in exchange for good order and a representation of "work" is escape from or relaxation of institutional constraint -- films, records, visits, outings, breaks, an "easy time." (Woods, 1979, p. 153)

4. Fraternization: Teachers may attempt to avoid conflict with their students by developing friendly, personal ties with them. Stebbins (1981) describes this survival strategy in the following way:

> Some teachers attempt to win control of their pupils by <u>fraternizing</u> with them, by sharing their interests, their styles of speech, their fashions in clothing, and so forth (e.g., Denscombe, 1980a, pp. 60-61). At times teacher initiated humor has fraternization as its aim (Stebbins, 1980; Walker and Goodson, 1977; Leacock, 1969, pp. 94-97). Levity and permissiveness may be regarded as instances of either negotiation or fraternization,

depending on the circumstances surrounding their use (King, 1978, pp. 50-51; Leacock, 1959, pp. 94-97). (p. 248)

Woods (1979) makes the following more general remark in this regard:

> Much survival teaching takes the form of entertainment. It is quite often reflected in styles of speech and associated with culture-identification...Less "identification" associated are forms of teacher wit and humour. A stage manner helps, and the fun is often directed good-naturedly and matily towards the inmates. The displacement of reality in humour neutralized any potential conflict...Sometimes...a teacher directs laughter upon himself, frequently belittling his formal role. These divergences from the mainstream expected behaviour place him in a wider context and invalidate the narrowness of the immediate scene. Impersonation is a favourite vehicle. (pp. 156-157)

5. Absence or Removal: Stebbins (1981) describes this category as follows:

> Physically or psychologically removing oneself from the classroom is a way some teachers evade its problems. In modified form this strategy includes ignoring minor infractions of schoolroom rules (Hammersley, 1976, p. 114). David Hargreaves (1967, pp. 103-4) observed the occasional teacher sitting at his desk calmly marking papers, seemingly oblivious to the hubbub around him. Woods mentions daydreaming, falling asleep, leaving the room, absentation, and wasting time as additional expressions of this strategy. (p. 248)

Woods also mentions the tactics of stealing extra minutes at the beginning or endings of breaks, delaying the beginnings of lessons, stopping early, and so on (Woods, 1979, p. 160). He also notes tactics that extend beyond the classroom setting: for example, negotiating for desirable "free" or "planning" periods, avoidance of duties beyond the classroom (e.g., after school responsibilities) and so on (Woods, 1979, p. 160).

6. Ritual and Routine: The use of routines to stabilize and disambiguate the classroom environment has been frequently mentioned (see, e.g., Doyle, 1979, pp. 61-62). Stebbins (1981) suggests that ritual and routine

> serve as a means of control, since they help pace the activities of the classroom. They include structured exercises, group activities, audio-visual techniques, programmed learning, and work

cards. The student is carried along through the lesson with scant opportunity for side involvements. (p.248)

Woods (1979) notes that the absence of routines would place enormous pressures on the teachers:

> Teachers become addicted to routine and ritual. Once instituted, they are extremely difficult to get rid of. Rituals become associated with 'tradition' and 'ethos' and to change them means discontinuity and disjuncture. Routine is a narcotic, taken to soothe the nerves and mellow the situation. Once established, to do without it would involve the teacher in severe withdrawal symptoms.
>
> Routine imposes a structure on school life which pupils and teachers almost automatically come to accept, and serves as a basis for establishing control. Registration, form periods, assemblies, timetables, lesson structures and so forth are the bones of the school day. Within this overall structure, individual teachers establish their own routines...
>
> As Webb (1962) noted, this carries implications for what and how one teaches. Gump (1971) has shown that self-paced activities involve more difficult pupil management problems than in externally paced activities. Westbury (1973) has portrayed recitations and textbook teaching as coping mechanisms. Furlong has noticed, from the pupils' point of view, that "work" and "learning" is a desiccated, skeletal, structured and measurable form of knowledge. To them, learning is a "measured accomplishment." (pp. 162-163)

7. Occupational Therapy: This survival strategy aims at involving the students in some manual or physical activity that keeps them busy and thereby reduces the likelihood that they will give the teacher trouble (Woods, 1979, p. 163). Stebbins (1981) notes that occupational therapy, like routinization, "is based on a ... restriction of attention. Here pupils are told to draw maps, pictures, or patterns; do individual experiments in the science; or carry out projects in the industrial arts" (p. 249). Woods (p. 164) notes that teachers may engage in such therapy unilaterally -- busying themselves (e.g., with explanations at the board or with equipment or with individual pupils) while the rest of the class carries on as it will.

8. Morale-boosting or Rhetoric: Woods' last category of survival strategies refers to the rhetoric, educational theories, folklore or accepted wisdom that teachers use to justify to themselves the use of the the other

survival strategies mentioned. It is a "retrospective" strategy to neutralize any psychological tensions that might emerge in the course of accommodating to the pressures of the situation.

Stebbins (1981) suggests an additional type of survival strategy:

9. Controlling Talk: With this category Stebbins (1981) refers to the fact that:

> questioning, lecturing, limiting spontaneous pupil commentary, and related maneuvers [are]...strateg[ies] by which teachers pursue their twin goals of intellectual training and maintenance of order. Gouldner (1978, p. 38) watched her teachers keep trouble down by refusing to let certain pupils participate in the classroom discussion. Teachers may rely on different "participant structures" (Phillips, 1972, pp. 377-378) to foster the sorts of verbal interchanges they want with their pupils. These include interacting with the class as a whole (see also Payne and Hustler, 1980), or with part of it, while the others work quietly at their desks. Stubbs (1976, pp. 159-161) lists eight forms of 'metacommunication', which teachers use to advance their instructional aims: getting pupils' attention; controlling pupil talk; checking on understanding; summarizing; defining; editing pupil answers; correcting their answers; and specifying the topic of discussion. As Barnes (1969, p. 27) points out 'teachers are covertly signaling to their pupils what their role as learners is to be' (see also Keddie, 1971, p. 45). (p. 249)

The "survival strategies" summarized above are elements in the teacher's repertoire, modes of accommodation to contextual pressures. For the setting Woods studied the most important of these contextual pressures stemmed from a student clientele whose values and norms of behavior differed from those of the teacher (or perhaps more appropriately, differed from the values embedded in the organization of the school). Woods (1979) speculates that the level and nature of the teacher's "commitment" to the school will have an important influence on the type of the survival strategy (or strategies) that the teacher adopts:

> Domination and ritual and routine might be associated more with traditional forms of teaching, negotiation and fraternization with more progressive forms of teaching. The overall heuristic framework yields a number of hypotheses. Here are some examples:
> (1) The bigger the commitment, the wider the accommodation.
> (2) The bigger the commitment, the wider the use of rhetoric.

(3) The bigger the commitment, the more favoured will be the institutionally supportive strategies (socialization, domination, negotiation).
(4) The less the commitment, the more favoured will be the institutionally disruptive techniques (absence and removal, fraternization).
(5) The more "professional" the commitment, the more professional strategies will be favoured (socialization, rhetoric, negotiation, domination).
(6) The more "survival centered" the commitment, the more those strategies involving separation of teacher and pupil, and time passing will be favoured (absence and removal, therapy).
(7) The more accommodation, the greater the survival strategic orientation, and the less the education. And the converse of this. (This applies at both individual and institution level.)
(p. 168)

Woods' argument is valuable in that it provides some useful concepts and terms to describe teacher strategies, but more importantly because it seeks to link teachers' beliefs to their social roles and career strategies, and to contextual constraints (considered somewhat more broadly than by ecological theorists) and patterns of classroom behavior (at the same time acknowledging that "beliefs" articulated by teachers may be elements of "morale boosting" or "rhetoric" -- that is, retrospective rationalizations for what have become established patterns of action). Woods' perspective highlights the importance of developmental and career patterns that influence the teacher's beliefs and behaviors over time, as well as the importance of considering institutional and contextual pressures arising beyond the classroom.

Coda: The Necessity of Studying Beliefs in Context

The review above has highlighted issues and topics and introduced frameworks and concepts which should be of use in analyzing data already collected by the TBS program (these are summarized later in the report in the section on analysis). One point which emerges is that context, however it is conceptualized, is fundamentally important to the interpretation and explanation of teachers' beliefs, and to any attempt to link these beliefs to actions in either correlational or causal fashions. The major shortcoming of

teacher thinking research is its lack of attention to context. The major potential value of the TBS research is in exploring the ways in which beliefs and context interact, and to explore how these interactions influence teachers' subjectively reasonable beliefs about teaching and their actual practice of teaching.

METHODOLOGY

PART I: METHODS OF INQUIRY

Studies of teacher thinking have used a variety of techniques to generate data. These techniques include thinking aloud or process tracing, policy capturing, lens-modeling, stimulated recall, journal keeping, and repertory grid. These methods are often supplemented by interviews and field observations. The following section will briefly review each of these methods of inquiry.

Thinking Aloud or Process Tracing

The thinking aloud or process tracing method requires that subjects verbalize their thoughts while performing a task, solving a problem, or making decisions. These responses are recorded and analyzed. Usually the analysis produces either a description of the content or a description of the sequencing of teacher thought.

Policy Capturing and Lens-modeling

Policy capturing is a method used to study teacher judgement. A typical policy capturing study would involve the presentation to a teacher of a number of descriptions of students. These descriptions would vary along such variables as achievement, gender, classroom behavior, and classroom participation. The descriptions have been constructed by researchers so that all possible combinations of these different "features" appear in the set of students to be judged. Teachers are then asked to judge, for example, which students have a chance of a "B" average or better at the end of the school year. This method produces a multiple regression equation that describes the relative weightings teachers attach to the "features" of the students being judged.

A lens-modeling study requires a criterion measure of the event being judged (e.g., students' preferences for reading materials), a list of cues predictive of the criterion measure (the presence of absence of fantasy,

adventure, danger, and humor), and teacher judgements of students' preferences. A regression of a teachers' judgements on the cues provides a model of the teachers' policies for reaching their judgements. The correlation between a teacher's prediction of each student's reading preferences and students' actual preferences provides a measure of judgemental accuracy.

Stimulated Recall

Stimulated recall typically uses audiotapes or videotapes to aid a person's recall of thoughts during the periods being recorded. This particular method has taken a variety of forms. Some researchers pre-select portions of the tape for replaying while others replay the entire tape. Some researchers ask prespecified questions each time the tape is stopped while others rely solely on open-ended commentary from the teacher. Control of when to stop the tape varies from researcher control to teacher control to shared control by the teacher and the researcher (see section on teachers interactive thoughts and decisions for a more detailed discussion of this technique).

Journal Keeping

Research on teacher thinking and decision making has utilized the technique of journal keeping primarily in studies of planning. Teachers are typically asked to keep written records of their planning activities and then to comment on such things as their reasons for selecting one activity over another, the context in which their plans are made, and their reflections and evaluations of their plans after they are realized in the classroom. Journal keeping is often supplemented by interviews with the teacher to clarify journal entries. Journal entries are usually subjected to content analysis and the data are used to generate descriptions and models of the planning process and the factors that influence it.

Repertory Grid

The repertory grid technique is used to study teachers' implicit theories or beliefs about teaching. This method was developed by George Kelly (1950) to identify personal constructs that influence behavior. Usually the technique consists of presenting the teacher with a series of cards on which are written short statements, called elements, about the domain the investigator is interested in. These statements or elements can be generated by either the researcher or the teacher. The teacher is asked to group the cards and to explain the similarities and differences between the groups. The discussion of the groupings and the labels provided by the teachers for the groups are used to generate "constructs." The constructs and the elements are then placed in a grid format and the teacher is required to rate the association between the elements and the constructs. Grid results are then factor analyzed. Factor analysis results are used to represent the relationships among the various constructs.

PART II: CRITIQUE OF METHODS OF INQUIRY

All of the methods just reviewed rely heavily on various forms of self-report to study teacher thinking. Researchers who use these methods make the assumption that verbal reports provide valid and reliable data concerning the cognitive processes of teachers. They also assume that teachers are "able and willing to articulate their thought processes" (Shavelson & Stern, 1981, p. 458). When researchers make the decision to use verbal self-reports, two critical issues must be addressed. First, there is the question of what self-reports actually are. Second, there is the question of when self-reports will be accurate.

What are Self-reports?

The degree to which self-reports represent true awareness by the teacher of cognitive processes is arguable. Nisbett & Wilson (1977) believe that persons have no direct access to their mental processes. They argue that self-reports are not the result of direct introspective awareness, but rather the result of recalling a priori causal theories which the person regards as appropriate explanations for the outcomes of his/her thoughts. A critical component of their argument is the definition of "mental processes." Nisbett & Wilson (1977) make a distinction between "content" and "process" stating that persons generally do have access to a great amount of private knowledge concerning mental content:

> The individual knows a host of personal historical facts; he knows the focus of his attention at any given point in time; he knows what his current sensations are and has what almost all psychologists and philosophers would assert to be "knowledge" at least quantitatively superior to that of observers concerning his emotions, evaluations, and plans. (p. 255)

Mental processes, on the other hand, are rather vaguely defined as complex mental activities involved in such tasks as evaluation, judgement, and problem

solving. It is awareness of these mental activites or processes which operate on stimuli that are viewed as inaccessible through self-introspection.

Nisbett & Wilson (1977) also make a distinction between "intermediate results of a series of mental operations" and the operations or processes by which final results are obtained. An example provided to illustrate this distinction was the following:

> An acquaintance of the authors'...was asked to introspect about the process by which he had just retrieved from memory his mother's maiden name. "I know just what the process was," he said. "I first thought of my uncle's last name, and since that happens to be my mother's maiden name, I had the solution." (p. 255-256)

According to Nisbett & Wilson (1977) the acquaintance's answer reflected a confusion of intermediate results with the process by which the final result was obtained.

Smith & Miller (1978) provide a series of counter-arguments to Nisbett and Wilson's (1977) position on self-reports. They argue that it is very difficult to accept a distinction between intermediate results of a process and the process itself. They offer the example of mental rotation studies which require subjects to transform or rotate a visual stimulus presented in one orientation to a different orientation.

> Studies show...that the subject has some form of "mental image" that he or she rotates smoothly from the given orientation to the desired one and that the image takes on intermediate positions between the two orientations at intermediate stages of the process of rotation. Access to this sequence of intermediate results would be labeled by Nisbett and Wilson as somehow different from access to the process by which the final result is generated. However, the process of rotation (including its direction, speed, etc.) is clearly implied by the sequence of intermediate results. When one considers that a greater density of intermediate results could be obtained by instructions to the subjects, thereby further defining the process stages that intervene between each given intermediate result, a distinction between process and the sequence of transformed intermediate results becomes artificial in the extreme. (Smith & Miller, 1978, p. 539)

Smith & Miller (1978) also point to studies which do seem to show that people can accurately report on their mental processes -- studies of

diagnosticians weighting information to produce a judgement concerning a target person. Nisbett & Wilson (1977) dismiss these studies claiming that they demonstrate two separate and independent processes: The application and the reporting of socially learned rules. The person's accuracy in reporting on the causes of their behavior and evaluations is not regarded as evidence of direct access to processes of evaluation; but rather, "evidence for nothing more than the ability to describe the formal rules of evaluation" (Nisbett & Wilson, 1977, p. 254). Smith & Miller (1978) argue, however, that mental processes can be analyzed at a number of different levels, and that at a given higher cognitive level these socially learned rules referred to above <u>are</u> the process. They cite the example of solving a problem by long division. "The mathematical rules are taught to all school children, can be reported on by all, and <u>are</u> the process of long division" (Smith & Miller, 1978, p. 360).

Smith & Miller (1978) conclude their critique by recommending that researchers focus not on the question of whether people have access to process but on the more productive and interesting question of when self-reports will be veridical.

Accuracy of Self-reports

One problem with using self-reports as data regarding mental processes is that many of these processes may not be consciously employed. Instead they function relatively automatically and are therefore inaccessible. It is also reasonable to assume that many cognitive processes may be employed simultaneously ("parallel processing"), making the task of reporting on them difficult, if not impossible. As Calderhead (1981) points out,

> ...for the experienced teacher, much classroom behaviour may have reached a level of automatisation...in that it has become a largely automatic part of the teacher's classroom activity: The teacher may have long since forgotten the rationale for behaving in such a manner and the behaviour may be engaged in unthinkingly." (p. 213)

For this reason, Smith & Miller (1978) suggest that tasks that are novel and of interest will be more likely to evoke accurate introspective awareness of process. Conversely, in overlearned and routine situations mental processes are likely to function relatively automatically and therefore are inaccessible.

A related problem with self-reports is the possibility that some areas of a person's knowledge may not be communicable verbally. Calderhead (1981) suggests that a sizeable portion of a teacher's everyday cognitive activity may be this "tacit" knowledge developed through experience and trial and error and could not be spontaneously verbalized.

Odell, Goswami, & Herrington (1983) note that the validity of self-report information is subject to at least two criticisms. First, it may be that the interviewer will bias the verbal response by the kinds of questions that are asked. Further, there is the chance that respondents will mislead the researcher and themselves by allowing feelings or preconceptions to influence their responses. Development of interview procedures which will help an interviewer be as nondirective as possible are seen as a partial solution to the first criticism. In response to the second criticism, Calderhead (1981) points out that verbal reports of cognitive processes are not always uncheckable. In the case of teachers, "some crude indication of the validity of reported thoughts may be obtained from their internal consistency, and the degree to which teachers' accounts appear to match observed classroom practice" (Calderhead, 1981, p. 215).

Nisbett & Wilson (1977) describe the conditions which will promote accuracy in verbal report as the following:

> reports will be accurate when influential stimuli are (a) available and (b) plausible causes of the response, and when (c) few or no plausible but noninfluential factors are available. (p. 253)

Finally, Calderhead (1981) describes a problem not necessarily with the accuracy of the verbal reports but with the interpretation of these verbal reports by researchers. He points out that

> the models which researchers bring to bear upon this data may differ from the interpretive frameworks of teachers. The researcher, in considering other sources of data, and problems other than those thought about by teachers, may still be interested in teachers' explanations of their own behaviour as data, but may ultimately be seeking explanation of another kind. For example, an explanation why many primary school teachers reserve the mornings for "formal" work may be found not simply in teacher's thoughts but in the headteachers' expectations, the school "ethos," environmental constraints such as shared books and equipment, teacher training, the teachers' own experience as pupils, etc. What counts as an appropriate explanation to the researcher depends upon the model which the researcher adopts or constructs, which may in turn depend upon the purposes of the research. (p. 215)

PART III: SELECTION OF METHODS OF INQUIRY

This section provides rationales for the selection of the three kinds of methods used in the TBS: stimulated recall interviews, repertory grid interviews, and classroom observations. First, however, it might be useful to discuss why the decision was made to use multiple methods.

A theme that recurs in the discussion of the literature in this report is the sensitivity of the findings from research on thinking and belief systems to the types of methodologies used. To some extent, a method determines the type of information it will produce. Some methods encourage teachers to speak in generalities, or in terms of their explicit theories of how things should be. Other methods may induce the teacher to speak very specifically in terms of discrete incidents. As Calderhead (1983) concluded, drawing on his own experiences in teacher thinking research:

> different research methods were found to pick out different types of knowledge. Repertory grid techniques in which teachers' constructs are elicited by asking them to compare one pupil or group with another, or non-focussed interviews (e.g., "Tell me about your pupils") tend to reveal general, decontextualised assessments (behaviour, ability, maturity, sociability) -- a finding borne out in previous investigations using the same techniques...Interviews focussed upon particular classroom actions [e.g., stimulated recall interviews] or features of lesson planning (e.g., "Why did you.....?" or "Can you talk about what was happening then.....?") reveal different types of knowledge, ranging from specific attributes and teachers' routines to general knowledge about children. (pp. 9-10)

The conclusion that Calderhead draws from this seems quite justified: research on teacher thinking (or, one might add, any classroom process) that relies solely or primarily on a single procedure runs the very strong risk of presenting only a partial, if not actually distorted, picture of the situation. The use of multiple methods does not of course completely resolve the problems of methodological bias. It does, however, give researchers a better chance of overcoming this bias by allowing them to "triangulate" their findings: to contrast findings on the same substantive issue produced through

different methodological procedures. One can in this way at least learn to recognize types of findings that are mere epiphenomena of methods.

If it can be granted that the use of multiple methods is a desirable research practice, it still remains to justify the selection of a particular set of methods. The TBS has relied primarily on three methods: stimulated recall interviews, repertory grid interviews, and classroom observations.

Using Stimulated Recall

One reason for using stimulated recall interviews in teacher thinking research is quite straightforward: this is the method that has provided the bulk of the information on teachers' interactive or in-flight thoughts and decisions (see the reviews by Clark & Peterson, in press; Brophy, 1984). The method is eminently suited to this task: it provides a vivid and accurate picture of what transpired in the class that the teacher can comment on. As the previous discussion of methods of inquiry made clear, the most accurate type of self-reports of thought processes are thinking aloud or process tracing studies in which people explain what they are doing as they do it. This is of course impossible to do in a normal classroom setting, but it can be reasonably argued that stimulated recall interviews are the next best thing (provided they are done as soon as possible after the class session actually takes place).

However, as the discussion in the section of this report on teachers' interaction thoughts and decisions should have made clear, there are many different kinds of stimulated recall interview procedures. The major variable for the TBS was deciding when the tape should be stopped for discussion and who should stop the tape. Several approaches to this have been pursued: from making the teacher the party responsible for determining when the tape should be stopped, to the researcher taking full control of when the tape should be

stopped and what should be asked, to the practice of stopping the tape randomly. After some experimentation with these different techniques during the Fall 1982 semester, TBS staff, after consultation with an advisor experienced in the use of stimulated recall methodology (Greta Morine-Dershimer), decided to take a middle course and use three types of stimulated recall interviews. The first two interviews are non-directive, with the teachers responsible for stopping the tape; the second two interviews are controlled primarily by the researchers; while the final two interviews are used to test speculations and hypotheses generated during the first weeks in the teachers' classrooms. These interviews are described in detail in a section below.

The Repertory Grid Technique

The TBS was interested in selecting a methodological technique which could be used to obtain information on teacher beliefs on a wide variety of issues, including: beliefs about the classroom and teaching; beliefs about students and learning; beliefs about student misbehavior; and beliefs about contextual factors such as school administration and community influences on teacher behavior in the classroom.

The project was also interested in selecting a self-report methodology which would maximize the possibility of obtaining accurate self-reports. This entailed using a methodology which minimized the possibility of the interviewer biasing the verbal responses of teachers by the kinds of questions asked. In other words, a non-directive interview procedure was needed (see the previous discussion on the accuracy of self-reports).

A technique was also needed which would allow teachers to "speak for themselves." As Nash (1973) noted:

> if we want to know what attitudes a person holds we should make it our task to discover what these actually <u>are</u>, rather than, as is

> conventionally done, ask him to agree or disagree with a list of statements somehow held to form a "scale." (p. 21)

Finally, project personnel were interested in selecting a methodology which could be closely associated with the practice of teaching.

The repertory grid technique (Kelly, 1955) seemed to satisfy all of these requirements. It had been used to study a variety of teaching phenomena: curriculum implementation by teachers (Olson, 1980, 1981; Bussis et al., 1976); teachers' conceptions of reading (Duffy, 1977; Barr & Duffy, 1978); teachers' views of students (Ball, 1981; Morine-Dershimer, 1978-79a; Nash, 1973; Taylor, 1976, 1979); and teachers' beliefs and principles of teaching (Munby, 1982a, 1982b). Use of the methodology also entailed using a non-directive interview procedure which solicited teacher responses in the "language of the teacher." Another advantage to using the technique is that it allows one to make systematic comparisons of individuals' operational definitions of the areas under study.

The decision to use the repertory grid technique entailed making some decisions regarding procedures to be followed. Kelly himself (1955) makes the point that 'the procedure can be varied in a great many ways.' One of the first questions is whether one should provide the elements and constructs for an individual or whether these should be elicited from each individual on a personal basis. As Pope and Keen note (1981):

> In its original use as a clinical technique, personal elicitation of elements and constructs was the method adopted — indeed purists would argue that the theoretical base for repertory grid techniques emphasizes individuality and that by definition constructs are <u>personal</u>. However, there has been an increasing tendency of late to detach the technique from its theoretical base and so the use of a standard form of repertory grid in which both the elements and the constructs are provided for the person rather than elicited from the individual concerned, is becoming more widespread. (p.40)

The decision, then, is based somewhat on whether Kelly's theory of personal constructs is adopted in conjunction with the method. The TBS

project has found the technique a useful research tool for structuring non-directive interviews with teachers. However, this does not necessarily imply a commitment to the theory of personal constructs. As Nash (1973) noted:

> I am yet to be convinced that personal construct theory is as useful as its principal research tool the repertory grid. The grid technique seems to stand well on its own. (p.40)

The TBS has used both methods for establishing elements -- providing them in some cases and eliciting them from the teachers in others. In the "Views of Teaching" interview the elements were elicited from the teacher. The decision to use this procedure was made on the basis of a review of similar work done by Munby (1982a, 1982b). Similarly, in the "Student Sort" interview, the names of students in the classes under observation were used because of earlier success by other researchers in using these "naturally available" elements (Ball, 1981; Morine-Dershimer, 1978-79a; Nash, 1973; Taylor, 1976, 1979). The elements in the "Student Misbehavior Sort" interview were provided by the researchers and consisted of thirty examples of student misbehavior. The provision of these elements in this interview allowed for one of the four repertory grid interviews to use the same elements across all teachers in the sample. Elements for the fourth interview, "Administrative/Community Influences," were derived from teacher responses to the questions asked in the first part of the procedure. Project personnel identified from the teacher responses to questions, influences in the community and the school administration that the teachers seemed to think affected their behavior in the classroom. An attempt was made to use the teachers' own words as much as possible. This last elicitation procedure was an experimental attempt to extend the repertory grid method to the study of a new substantive area.

Constructs in each interview were derived from the teachers' discussions describing the composition of the groups of elements formed. The grouping procedure used by the TBS to elicit constructs was the "full context form" instead of the more commonly used "minimum context form" of the repertory grid interview. The minimum context form of elicitation consists of presenting the teacher with three elements at a time and asking him/her to group together the two which seem most alike. The full context form, on the other hand, involves presenting the teacher with all of the elements at one time and asking the teacher to group the elements that share something in common. The full context form was chosen because both supplied and elicited elements were used in the series of interviews administered. As Olson (1981) has noted

> if the respondent has not been involved in supplying elements for the kinds of situations offered by the investigator, then the respondent will not be sure just what sorts of situations are to be construed and not wanting to "fail," may key on superficial aspects. This might be a serious source of problems ... and is overcome, to some degree, by using the full context method. (p. 14)

Finally, elements were rated against constructs using the method suggested by Munby (1982a, 1982b): asking the teachers to rate each element against each construct as either a 3, 2, or 1. Three indicates "definitely associated," two indicates "neutral," and one was used to indicate "definitely not associated."

A more extensive discussion of the specific repertory grid procedures used by the TBS can be found in a section of this report that follows.

Classroom Observations

In the reviews of the literature in previous sections the point was made that one difficulty in interpreting research on teacher thinking and beliefs derived from the fact that beliefs and thoughts were studied in a vacuum, in interviews outside the classroom setting or in experimental settings. One common response to this problem in teacher thinking research has

been to videotape teachers' classrooms and use these tapes as the bases for interviewing teachers about their thoughts and beliefs (see the discussion of stimulated recall methodology). However, as researchers have become more experienced in the use of videotaping in the classroom, a consensus has emerged that videotaping should not be used as an autonomous methodology. Rather, detailed observations are required in addition to the videotaping in order to allow accurate interpretation of the filmed material (see Erickson & Wilson, 1982; Grimshaw, 1981).

The TBS has used classroom observation primarily as an adjunct to the other methods used, to provide a more descriptive and detailed body of information that allows teachers' expressions of their thoughts and decisions to be compared to their actual classroom practice. A discussion of classroom observation procedures is provided in a section below.

PART IV: DISCUSSION OF METHODS USED

This section describes the methods and procedures used by the TBS. Included are discussions of site selection, teacher selection, and selection of class periods; as well as descriptions of the research methodologies used: stimulated recall interviews, classroom observations, and repertory grid interviews.

Site Selection

The TBS sought to study teacher thinking and behavior in a variety of community and school district contexts, accordingly the following selection procedures have been used:

1) schools have been selected in order to achieve representation of rural, suburban, and urban settings;
2) schools have been selected that have ethnically diverse student bodies; and
3) schools have been selected in school districts with different organizational characteristics.

Description of Sites

The TBS has conducted research in three schools. These school sites are described below.

School 01. School 01 is located in a rural district surrounding a town with a population of 3,700. At the time of the study the total school district enrollment in grades one through twelve was 2,500. School 01 had an enrollment of 700 students in grades six, seven and eight.

The school had an ethnically diverse student population: 67.1% Anglo, 17.9% Black, and 14.8% Hispanic. A majority of these students lived near School 01, which was located in a central region of the town. However, many students came from the outlying rural areas. Students at the school were from farming and lower and middle class backgrounds.

School 02. School 02 was located in a suburban district near a medium-sized city with a population of 350,000. The total enrollment of the school district totaled 4,100 students in grades kindergarten through twelve. The total enrollment for School 02 in grades seven and eight was 622.

The community where the school was situated did not have an identifiable central area. The community was comprised of four regions. These were the following:

1) A military installation near the school where many military personnel and their families lived; a majority of the Anglo students at School 02 lived there;

2) A community comprised of Mexican-American and Black families located approximately seven miles from the school (this was a low-income neighborhood located in a nearby city but included in the attendance area for school 02);

3) A low income Black community located a short distance from the school, and;

4) A rural community, composed of students from the outlying rural areas of the school attendance areas. These rural students were a heterogeneous group with a majority coming from farming and ranching families. These rural students were mainly from farming and working class backgrounds.

School 02 was in geographic proximity with School 01 and the campuses had adjoining attendance areas.

School 03. This site was located in a medium-sized city in a school school district with a total enrollment in grades kindergarten through twelve of 54,000 students. A total of 500 students attended School 03 in grades seven and eight.

The school district where School 03 was located had implemented a court-ordered desegregation plan. As a result, students at School 03 represented a

diversity of backgrounds. The ethnic distribution of students was 45.4% Anglo, 27.6% Black, and 25.4% Hispanic. A majority of the Anglo students were from upper class backgrounds and lived in the school neighborhood. The majority of Black and Hispanic students were bused to the school from a low income neighborhood in the eastern section of the same geographic location where students who attended School 02 resided.

Teacher Selection

Procedures for teacher selection began once school sites had been approved for study. The selection was initiated when project staff members contacted principals at the school sites and requested time during regularly scheduled faculty meetings to solicit volunteers for participation in the study.

Meetings at Schools 01 and 02 were held during faculty meetings. At School 03, the school principal requested that the presentation be limited to teachers nominated by the principal.

Meetings with Prospective Participants

The TBS staff met with faculty members at the study sites. During these meetings project staff members presented an overview of the study. Included in the presentations was information concerning the following matters: the purpose of the proposed study, procedures and methods to be used, teacher selection criteria, time requirements, and consultation fees to be paid to participating teachers. After the presentation, teachers were given an opportunity to ask questions about the study. Finally, those teachers who expressed an interest in participation were asked to complete survey forms which requested information on the teachers' ages, sex, educational backgrounds, teaching experience, and current class schedules.

Selection Criteria

Prospective participants were then contacted individually by project members and preliminary observations were scheduled with each teacher. Two observations of each teacher's classroom periods containing average ability students were scheduled. Following these observations, project staff members met and selected participants, using the following criteria:

1. Participants should be teachers of average ability classes at the seventh or eighth grade levels.

2. Participants should be teachers of major subject matter areas (i.e., mathematics, social studies or history, science, or English).

3. Participants should have a minimum of two years teaching experience at the present school site.

4. Participants should teach some classes which included students from diverse socioeconomic and ethnic groups.

5. Participants should be able to allocate time for interview sessions at least once a week during conference periods and after school.

Attention was also given in the selection process to balancing the samples across schools in terms of subject areas and grade levels. Once selection decisions had been made, all teachers who had completed survey forms were notified of the selections made and were thanked for taking an interest in the study.

Characteristics of the Sample

The study sample can be described according to the teachers' sex, ethnicity, teaching experience, subject area, age, semester of participation, and grade level taught. A summary of the sample characteristics is presented in Table 3.

Sex of Teachers. In the sample of eight teachers, there are five females and three males. Males are represented at two of the three schools studied

Table 3

Description of Sample

Teacher Number	School Number	Sex	Ethnicity	Years of Teaching Experience	Age Range	Subject Taught	Grade Level	Semester Studied
01	01	Male	Anglo	15	35-44	Texas History	7th	Fall 1982
02	01	Female	Anglo	5	25-34	English	8th	Fall 1982
03	01	Female	Anglo	8	25-34	American History	8th	Spring 1983
04	01	Male	Black	22	45+	Math	8th	Spring 1983
05	02	Female	Anglo	5	25-34	Math	8th	Spring 1983
06	02	Female	Anglo	9	45+	Texas History	7th	Spring 1983
07	03	Female	Anglo	13	35-44	English	8th	Fall 1983
08	03	Male	Anglo	9	35-44	American History	8th	Fall 1983

(Schools 01 and 03). There were no male volunteers at the third school (School 02). Overall, there were relatively few male teachers at School 01, and few other than coaches at School 02.

Ethnicity of Teachers. Seven of the eight teachers studied are Anglo. The only minority in the sample was a Black male teacher at School 01. Two other minority teachers from School 03 who expressed an interest in participating in the study did not meet selection criteria. Overall, the three schools studied have had few minority teachers, and few have volunteered to participate in the TBS study.

Experience of Teachers. The years of teaching experience of the teachers in the sample ranges from a minimum of five years to a maximum of twenty-two. All of the teachers in the sample were in at least their second year at the site schools.

Subject Areas Taught by Teachers. The sample contains teachers of three content areas: history, mathematics, and English. Four of the eight teachers taught history (two teaching seventh grade Texas history, and two teaching eighth grade American history). Two eighth grade mathematics and two eighth grade English teachers comprise the balance of the sample.

Age of Teachers. The ages of participants were reported in age ranges: under 25; 25-34; 35-44; and 45+.

Semester of Participation. The number of teachers participating in the study varied depending on the semester studied. During the initial semester, the Fall of 1982, when procedures initially were being tested, only two teachers participated from School 01. During the second semester, the Spring of 1983, two teachers participated from each of two schools, School 01 and School 02. During the third semester, the Fall of 1983, two teachers from a third school, School 03, were studied.

Problems in Teacher Selection

The major problem encountered in selecting teachers was obtaining an adequate number of volunteers who met selection criteria. This reliance on a limited number of volunteers caused problems when attempting to balance the total sample of teachers in terms of the characteristics discussed previously: sex, ethnicity, experience, sex, subject areas taught, grade levels taught, and semester of participation. Priority was given to balancing the sample across schools in terms of grade levels and subject areas taught. The sample discusssed above and summarized in Table 3 represents the best sample possible given the limitations imposed by the use of volunteers.

Selection of Class Periods

After teacher selection had been completed, the teachers chosen to participate in the study were asked to describe the class periods they taught. Teachers were asked to describe their classes in terms of ethnic makeup, student ability levels, and student behavior. Observations were then scheduled for each teacher's class period which met the following criteria:

1. The class was an average ability track. Class periods dominated by high ability or remedial students were not included in the sample.

2. The class contained a diversity of students from different ethnic and racial backgrounds.

3. The class was one which the teachers considered "normal" and representative of most classes which they were teaching or had taught in the past. Classes which teachers considered "unusual" or about which teachers expressed concerns regarding observation were excluded from the study.

After observations of the teachers' classes which met the above criteria, one class period of each teacher was selected as a focus of study. Criteria for this final selection centered on selecting a class which included a diversity of students from different ethnic and racial backgrounds. Some

consideration was also given to selecting classes later in the school day in order to reduce the amount of time that would transpire between classroom observations and stimulated recall interviews to be held after school.

Stimulated Recall

Conners (1978) defines simulated recall methodology as, "a branch of introspective methodology in which audio or visual cues are presented to facilitate a subject's recall of covert mental activity which occurred simultaneously with the presented cue or stimuli" (p. 10). Problems with the interpretation of self-reports of mental processes have been discussed above. Various versions of stimulated recall interviews have been described in the section of this report on teachers' interactive thoughts and decisions. In this section, the procedures used by the TBS program in conducting stimulated recall interviews are described. General characteristics of the interviews are described first (e.g., the setting of the interviews); details of the interviews themselves are then discussed (e.g., questioning strategies); and, finally, videotaping strategies are described.

The stimulated recall interviews were conducted after school in the teacher's classroom. In order to minimize disruptions, only the interviewer and the teacher were present at the interview sessions. Teachers were requested to allow at least 90 minutes for the interview. All interviews were scheduled on the day of classroom videotaping in order to minimize recall problems. When possible, equipment was left in the classroom after videotaping in order to minimize set-up time after school and make more efficient use of interview time.

The equipment used for the stimulated recall interviews consisted of a videotape player, a videomonitor, and a cassette recorder.

Interviewers followed written procedures for conducting interviews. Before the videotape viewing, the interviewer asked the teacher to describe the events of the lesson that had been observed earlier in the day. The interviewer attempted to obtain a detailed description of the class, including events described in the appropriate sequence. The teacher was then asked to describe the major goals for the lesson, and to evaluate how successful the lesson was with respect to those goals and in comparison to other classes that same day.

The main portion of the interview involved the viewing and discussion of the videotape. At the beginning of this portion of the interview, the equipment was placed so that it would be accessible and easily viewed by both interviewer and teacher. When researcher or teacher spoke during the course of the interview, the videotape player was turned off in order to obtain clear audio recordings of the comments being made. Once the entire videotape had been viewed, the teacher was asked to compare his or her initial impressions of the lesson with his or her impressions after having viewed the videotape. The interview then concluded, with the interviewer thanking the teacher for participating in the interview.

Conduct of the Interviews

In the present study, stimulated recall interviews were conducted six times during the semester with each teacher. Three types of interviews were used: "nondirected", "directed" and "hypothesis testing".

In the nondirected interviews, the videotape was stopped for discussion and comment only at those points selected by the teacher. Directions such as the following were used to guide the teachers' performance on the task:

> [The researcher says] I'm going to play back the videotape of your class now. Instead of stopping it and asking you specific questions myself, I'd like for you to stop the tape when you see yourself making a decision and tell me what you were thinking at that point. Examples of decision points might be: making decisions about

routines, decisions about discipline, reactions to unexpected or unanticipated events, or moments where you are thinking about content and how it interacts with the students in the classroom. Also, if you see things on the tape that you want to comment about, even though they aren't exactly decisions, go ahead and stop the tape and talk about those events.

Directed stimulated recall interviews varied from the nondirected interviews in that during the directed interviews both interviewer and teacher chose stopping points on the videotape. Directions to the teacher were much the same as in the non-directed interviews. In addition to this, the interviewer stopped the tape at a number of loosely specified points -- the second or third desist or reprimand to a student; at transition points (when the teacher introduced or wrapped up discussion of a content area, or initiated or ended an activity); at randomly selected points where the teacher elicited some sort of performance from a student or group of students, or at points where a student or students requested information or assistance from the teacher. At these points the teachers would be questioned with such non-directive probes as "what were you thinking here?", "what was running through your mind at this point?" and so on.

The third type of interview conducted was the hypothesis testing interview. These interviews were conducted in order to test hypotheses developed for each teacher based on data collected during the semester. During these interviews, both the interviewer and teacher stopped the tape for discussion, however, the interviewer would attempt to select appropriate points during the interview to interject questions related to the hypotheses developed for each teacher. When appropriate points for hypotheses testing were not found on the tape or during the interview, hypothesis testing questions were posed as straight interview questions at the conclusion of the stimulated recall interview.

All stimulated recall interviews were audiotaped and later transcribed.

Sequence of Interviews

The first stimulated recall interviews scheduled for the early part of the semester were nondirected interviews. The information obtained in these interviews was used to augment information from the repertory grid interviews and to identify critical incidents in the mind of the teacher early in the semester. The directed stimulated recall interviews were scheduled later in the semester in the hope of reducing the potentially biasing effects of the interviewers' more directive roles. The hypothesis testing interviews were the last interviews conducted in order to allow for sufficient time to analyze the data for the development of hypotheses.

Videotaping Considerations

In order to minimize the influence of external factors on subjects during videotaping and during stimulated recall sessions, familiarization activities were conducted. Students and teachers were introduced to the videotaping equipment two weeks prior to the first scheduled videotaping session. The project video technician and the classroom observer introduced themselves to the classes and gave an orientation to the study and the procedures that would be undertaken during data collection activities.

Videotaping equipment was set up and tested prior to the first videotaping session. Camera locations were selected to obtain the best possible view of the classroom while causing minimal obstruction for normal classroom activity. The videotaping equipment consisted of a 3/4" videotape recorder/player, a videomonitor, and a single camera mounted on a tripod. Two omnidirectional microphones were used to record sound. At first these were mounted on stationary stands. However, in more recent phases of the study microphones have been suspended from the ceiling of the classroom. This has

proven to be a less intrusive arrangement, and reduces the time needed to set up equipment.

The camera was placed along the side wall of the classroom. Two approaches to the filming were used: mounting the camera on a stationary tripod at a front corner of the room with a wide-angle lens; and stationing the camera in the back corner or the room or along the side wall and using a zoom lens controlled by a video technician. The wide angled lens captured more of the classroom setting but distorted the image to a degree that it was felt might impinge upon the quality of the stimulated recall interviews. Use of a technician-operated camera with zoom lens -- with strict operating guidelines for the technician -- has therefore been adopted. The guidelines of camera operation are as follows:

1. When the teacher is talking the camera frame should include the teacher and as many of the students as possible.

2. When a student speaks or is called upon by the teacher the camera should be moved, if necessary, so that the student is brought into the frame.

3. In general, whoever is at the focus of the interaction in the classroom should be in the camera frame.

4. If the teacher is moving around the classroom but not speaking, the camera should follow the teacher, keeping the teacher in the center of the frame.

5. If the teacher is stationary but not talking, if the students are doing seatwork or taking a test, the camera frame should include the teacher and as many of the students as possible.

6. If for any reason the classroom observer feels any of the criteria listed above should be overridden, the observer should move and make the necessary camera adjustments until such a time as normal criteria are once

again applicable. This should be noted in the observation protocols and should be explained.

Classroom Observation

Detailed, narrative notes were taken on each class period observed. Procedures followed when formulating the observation notes included the following:

1. Observers provided as much detail as possible on all areas of the classroom, especially the teachers' actions and interactions with students. Efforts were also made to take note of the multiple vectors of interaction going on around the room -- all of which could not be captured on videotape.

2. Observers recorded information on classroom climate, instructional and management moves of the teacher, teacher-student interactions, student-student interactions, disruptive or inappropriate student behavior, and miscellaneous events affecting classroom activity.

3. Observers also noted features of the class such as the composition and seating arrangement of students (i.e., the physical distribution of ethnic groups and sexes within the class), the props used (e.g., blackboard writing, handouts, tests, textbooks, etc.), and so on.

4. Time designations were included in the narrative records at regular intervals (e.g., at the beginning and ending of major instructional activities).

A total of eight teachers were observed during the three semesters of data collection. Table 4 summarizes the number of observations, class periods observed and number of observations by day of the week for the eight teachers studied. Observations of individual teachers during the first semester of data collection vary in terms of the number of class periods observed due to the fact that this period of data collection served as a "pilot test" for subsequent procedures and methods followed in the study.

Table 4

Summary of Observation Data

Teacher Number	Observation Total(Sem.)	Class Period(s) Observed	Number of Observations by Day of Week	Semester Observed
01	18	2nd & 5th	Monday-3 Tuesday-1 Wednesday-10 Thursday-3 Friday-1	Fall 82
02	20	5th & 6th	Tuesday-2 Wednesday-8 Thursday-10	Fall 82
03	11	7th	Tuesday-8 Thursday-3	Spring 83
04	11	4th	Tuesday-4 Thursday-7	Spring 83
05	10	6th	Monday-4 Friday-5	Spring 83
06	11	4th	Wednesday-6 Friday-5	Spring 83
07	10	5th	Thursday-10	Fall 83
08	10	4th	Thursday-10	Fall 83

The Repertory Grid Technique

Four different types of repertory grid interviews were completed by each teacher in the study: "Views of Teaching," "Student Sort," "Student Misbehavior Sort," and "Administrative/Community Influences." A set of general procedures was followed when using the repertory grid methodology with each type of interview. These procedures are discussed below. This discussion is followed by a specific description of each of the four different kinds of repertory grid interviews, as well as a discussion of the scheduling of the interviews.

General Procedures

Each repertory grid interview was in three parts: an initial interview to "sort" elements; a second interview for "griding" "constructs" and "elements"; and a third interview to review results of a factor analysis of the grids. (The terms in quotation marks are explained below in the body of the text.)

The initial interview usually began with a series of questions concerning the specific content of interest in a particular interview. For example, in the "student misbehavior sort" interview, the teacher was asked such questions as "How do you expect students to behave in class?" This was followed by an introduction to the task which provided the teacher with information concerning the purpose of the interview and the procedures to be followed. It also included either instructions to the teacher for eliciting "elements" or the presentation to the teacher of elements already constructed by project personnel. The elements for the "Views of Teaching" interview, for example, were elicited by the teacher and consisted of short phrases the teacher used to describe what someone might see when observing a class he/she was teaching. In contrast, the elements for the "Student Misbehavior Sort" were thirty examples of student misbehavior generated by project personnel.

After the presentation of elements or after the elicitation of elements, depending on the type of interview, the teacher was asked to sort the elements into groups. General instructions given for each interview were the following:

> What I would like for you to do now is to take the cards and group them in ways that you think belong or go together. You may have as many groups as you like. Even though you are going to have an opportunity to explain your groupings when you have finished, it would help me if you would sort of "think out-loud" as you are sorting the cards. Don't feel pressured to come up with an explanation, but it would help us if you could tell us what's going on in your mind as you are grouping. Please don't hurry; take as much time as you need.

After the grouping task was completed, the teacher was asked to explain the similarities and differences between the groups. The teacher was also asked if the groups could be further divided into sub-groups or if the teacher could think of additional ways to group the cards. This process continued until the teacher could generate no new groupings.

Between the first and second interviews project staff listened to the initial interviews, writing down phrases and statements used by the teacher when describing the composition of the groups. These words and phrases were used to develop "constructs" and became the items entered in the "construct" axis (to use Kelly's terminology) of the grid. The "elements" were entered in the other axis of the grid.

During the second interview the teacher was asked to complete the grid by rating the association between each construct and element using a 1, 2, or 3 rating. Three was used to indicate "definitely associated," two indicated "neutral," and one was used to indicate "definitely <u>not</u> associated." When the grid was completed, the teacher was told that an analysis of the grid would be the basis for the discussion in the next interview. As Munby (1982b) notes

> The operative assumption at this point in the procedure is that the terms used by ...[the teacher]...to distinguish or characterize the groups of elements are representations at one level of some set of coherent beliefs and principles (at another level) about her

> teaching, and the immediate task becomes one of determining what these might be. Presumably, coherence is reflected in the grid's scores of association. That is, if the distinguishing or characterizing phrases in the "construct" axis are thought of as "variables" and the "elements" as "subjects," the correlations among variables could be factored with the reasonably expectation that the "variables" which exhibit some commonality will be placed in the same factor. (Munby 1982, p. 22)

Thus, between the second and third interviews, the teacher's completed grid was subjected to a principal components factor analysis with varimax rotation using the PRIME subprogram FACTOR (Veldman, 1978). This resulted in a number of groups of factors showing the relationships among constructs (the teachers' distinguishing and characterizing words or phrases for the groups formed during the sorting task).

The third interview was used to review the results of the factor analysis with the teacher. The interview began with a brief, non-technical account of how the grid was analyzed to yield the groups or factors. Questions and discussion followed aimed at seeing if a satisfactory explanation could be found for the formation of certain constructs into factors.

Specific Procedures

As mentioned earlier, four different types of repertory grid interviews were completed by each teacher in the sample. A discussion of these follows.

Views of Teaching. This interview was designed to identify the teacher's beliefs about teaching and learning. The interview began with a series of questions concerning the teacher's personal history, professional background, and experience. The teacher was then asked to describe what someone might hear or see if they were to visit his/her class by providing brief descriptive statements to the interviewer such as "the teacher is writing on the blackboard" or "the students are grading each other's daily quizzes." These brief statements became the elements that were later sorted. An abbreviated form of this interview was repeated at the end of the semester. The repeat

consisted of asking the teacher to resort the original elements generated during the first interview. This re-sort yielded a set of constructs which were grided against the original elements. The grid was then factor analyzed as before and used as the basis for the third interview. The purpose of repeating the interview was to examine the stability of the teacher's responses over time.

Student Sort. The purpose of this interview was to elicit the teacher's beliefs or conceptions of students. The interview began with a series of questions concerning observations the teacher had made about students since the beginning of the school year. For example, the teacher was asked "How do your classes this year compare with your classes last year?" The elements the teacher was asked to sort were the names of the students in the class period under study.

Student Misbehavior Sort. This interview was designed to provide some idea of the way in which the teacher viewed student misbehavior in the classroom. This interview began with questions about student conduct in the teacher's classes. For example, the teacher was asked "What are some typical student misbehaviors that bother you the most in your classroom?" The elements the teacher was asked to sort consisted of thirty examples of student misbehavior (e.g., "not following dress code or grooming code," "running in hall," "stealing," and "gum chewing"). These examples of student misbehavior were provided by project personnel and were drawn from two sources: the student handbooks of the schools under study and examples of student misbehavior found in classroom observation protocols from previous work of the project. Before the sort the teacher was asked to examine the cards and remove any misbehaviors that the teacher did not have any first-hand experience with. Behaviors not included on the cards but mentioned by the

teachers in the preliminary phase of the interview were added to the elements to be sorted.

Administrative/Community Influences. The purpose of this interview was to discuss the possible effects of the school administration and the community on the classroom. This interview consisted of a series of questions concerning administrative policies, work conditions, staff development, community organizations, and the home life of the student. The elements for this interview were drawn from the teacher's responses to these questions.

Scheduling of the Interviews

The five repertory grid interviews were administered in the following order: Views of Teaching, Student Sort, Student Misbehavior Sort, Administrative/Community Influences, and Repeat of Views of Teaching. The interviews thus moved from a very general, unfocused and non-directive level; to a more specific, focused level. While the chronological timing of the interviews varies somewhat across the three semesters of the study, the order in which the interviews have been conducted has remained constant.

Interviews with Administrators

Administrators were interviewed at the conclusion of data collection activities at each of the school sites., An adaptation of the Administrative/Community Influences interview developed for teachers was used during this interview session. The interviews were structured to allow comparisons of the responses of administrators to those of the teachers collected earlier in the semester. Administrators were also asked to provide information on their educational backgrounds, professional experience, and to compare their present administrative experiences to other administrative positions held in previous years.

Both the principal and vice principal at each school site were interviewed individually. A total of six administrators were interviewed at

three school sites. All interviews were audiotaped and later transcribed. Interview sessions lasted a minimum of ninety minutes and were conducted in the offices of the respective administrators.

To supplement information in the interviews, administrators completed a questionnaire developed by the National Association of Secondary School Principals (Byrne, 1978). This questionnaire included information on such areas as background and professional training of principals, nature of current assignment, and issues facing secondary school principals. Besides providing information not available in the structured interviews, the questionnaire responses allowed for comparison of the study sample to the responses of a nationwide sample of secondary principals.

ANALYSIS

ANALYSIS OF TBS DATA

TBS data analysis can be viewed as the construction of a series of interconnected case studies. The case studies are organized along several lines.

First, the case studies focus on specific domains of teachers' subjectively reasonable beliefs about their teaching practice and the teaching context. These domains are summarized below:

1. One case study examines teachers' views and beliefs about their students and student misbehavior. The purpose of this analysis is to identify teachers' perceptions of their students and their relationship to teacher behavior in the classroom. Objectives of the analysis include the following:

    1) to identify the construct systems employed by teachers when conceptualizing students in their classrooms and compare these findings to those of other researchers, both at the secondary and elementary levels;

    2) to examine the relationship between teacher conceptions of students and teacher behavior in the classroom towards students; and

    3) to demonstrate how teacher perceptions of students are related to the instructional-management systems employed by the teacher in the classroom.

2. Another case study examines the teachers' views of administrative and community influences on their teaching. This analysis will examine the ways in which organizational and community settings are perceived by the teachers and influence their classroom practice. The analysis specifically focuses on the following factors:

    1) the position (e.g., social role, social status) of teachers in the communities served by their school, and their knowledge of the various social groups represented in those communities;

    2) the role of potential pressure groups (e.g., school boards, parents, parent organizations, teachers' unions) in the shaping of teachers actions and attitudes;

    3) organizational constraints and influences (e.g., systems of hiring and evaluation, the availability of resources); and

4) the official rules and regulations of the schools or districts governing teacher behavior.

The analysis also examines the ways in which the factors listed above are related to teachers' practices in the following areas: a) the maintenance of order in the classroom (i.e., discipline, calssroom management); b) the type of content taught and the manner of its presentation; and c) the teachers' knowledge of and attitudes towards their students.

3. A third case study examines teachers' beliefs about their classroom goals and the factors affecting the attainment of these goals. The analysis focuses on identifying the "goals" which the teachers see as underlying their practice, and to examine the ways in which these goals seem to be related to the teachers' actions in the classroom. Theoretical issues on the nature of goals and the relationship of goals to actions, and methodological issues concerning the identification of goals are also examined.

In keeping with Fenstermacher's (1978) "intentionalist" orientation, one aim of the case studies focusing on these domains is to construct a model of the teachers' beliefs about these areas (i.e., to construct researchers' models of the teachers' models of the target system). However, this is not the only aim of the case studies.

A second purpose of the case studies is to produce researchers' models of the teachers' actual actions in and operations for dealing with the target system for teaching. For example, in addition to modeling the teachers' beliefs about students, the case study focusing on that domain will also attempt to model the actual patterns of interaction between the teachers and their students, and to speculate on the causes of and constraints on these patterns of interaction.

A third aspect of the case studies attempts to draw upon one of the main strengths of the project's research design: its investigation of teaching in

a number of different contexts. Community, organizational and classroom contexts for the three school sites will be described and the teachers will be compared across dimensions such as the following: a) subject matter taught; b) the administrative environments of the schools in which they worked; c) the nature of the community they served and their relationship to that community; and d) the nature of their teaching experience (e.g., at other schools, at other grade levels; and so on.

Thus, rather than a simple aggregation of findings from the total set of teachers included in the study, the case studies will also attempt to compare, for example, math teachers with English teachers, teachers from the rural school with teachers from the urban school, and so on.

The Logic of the Case Study Approach

While the case study approach is frequently pursued, the logic of the approach is much less often scrutinized. However, one can reasonably inquire into the purposes of constructing case studies. Lijphart's (1971) distinction of six ideal types of case studies is useful in this regard.

Lijphart suggests that case studies may be of at least one of six types: "atheoretical case studies," "interpretive case studies," "hypothesis generating case studies," "theory-confirming case studies," "theory-infirming case studies," or "deviant case studies."

"Atheoretical" case studies are

> entirely descriptive and move in a theoretical vacuum: they are neither guided by established or hypothesized generalizations nor motivated by a desire to formulate general hypotheses. Therefore the direct theoretical value of these case studies is nil, but this does not mean that they are altogether useless ... Purely descriptive case studies do have great utility as basic data-gathering operations, and can thus contribute indirectly to theory building. (Lijphart, 1971, p. 691)

"Interpretive" case studies, like atheoretical case studies, do not attempt to explicitly link the phenomena being studied with theoretical formulations. They do, however

> make explicit use of established theoretical propositions. In these studies, a generalization is applied to a specific case with the aim of throwing light on the case rather than of improving the generalization in any way. (Lijphart, 1971, p. 692)

"Hypothesis-generating" case studies

> start out with a more or less vague notion of possible hypotheses, and attempt to formulate definite hypotheses to be tested subsequently among a larger number of cases. Their objective is to develop theoretical generalizations in areas where no theory yet exists. (Lijphart, 1971, p. 692)

"Theory-confirming" and "theory-infirming" case studies are explicitly tied to theoretical propositions. The cases investigated are known to possess variables theoretically linked to the validity of the propositions: "the case study is a test of the proposition, which may turn out to be confirmed or infirmed by it" (Lijphart, 1971, p. 692).

Finally, "deviant" case studies

> are studies of single cases that are known to deviate from established generalizations. They are selected in order to reveal why the cases are deviant -- that is, to uncover relevant additional variables that were not considered previously, or to refine the (operational) definitions of some or all of the variables. (Lijphart, 1971, p. 692)

Situating the TBS research in Lijphart's framework is a relatively straightforward task. The research is neither completely atheoretical nor is it explicitly linked to a body of theory (and therefore cannot be of the theory confirming or infirming or deviant case study types). Rather, the case studies are a mixing of the "interpretive" and "hypothesis-generating" types. They are "interpretive" in the sense that conceptual frameworks and theoretical concepts are utilized to construct models of the teachers' actions with regard to the target system of teaching. The case studies also seek to

generate hypotheses about an area which has been relatively neglected: the effects of contextual constraints on teacher thinking.

Any case study approach is faced with a basic problem: that of formulating generalizations on the basis of a very small sample of events and actors. Indeed, this problem was once held to vitiate any attempts to draw generalizations from the study of a single group for a single period of time (e.g., Campbell & Stanley, 1966, pp. 6-7). More recently, however, it has been acknowledged that considerable methodological rigor can be brought to the case study approach through careful and explicit attention to the multiple implications within the case generated by the researchers' theories or conceptual frameworks. Campbell (1975) refers to this as the "degrees of freedom" of the case study:

> In a case study done by an alert social scientist who has thorough local acquaintance, the theory he uses to explain the focal difference also generates predictions or expectations on dozens of other aspects ... [of the situation] ... and he does not retain the theory unless most of these are also confirmed. In some sense, he has tested the theory with degrees of freedom coming from the multiple implications of any one theory. The process is a kind of pattern matching ... in which there are many aspects of the pattern demanded by theory that are available for matching with his observations on the local setting. (Campbell, 1975, pp. 181-182)

Seen from this perspective, case study analysis is an evolutionary process. The researcher does not begin with a set of rigid, immutable categories or concepts onto which the data are to be mapped. Rather, issues and concepts -- and their multiple implications -- are "tested" on the data and are rejected, modified, or provisionally confirmed. As Campbell (1975, p. 186) notes, it is vital that this process of testing and modification of concepts be carefully and explicitly discussed in the presentation of the case study.

Coding and Data Analysis

The case studies described above are to be the responsibilities of individual members of the TBS staff. That is, the studies will be written independently, with each researcher analyzing all of the data as it relates to his or her focal concerns. This system of analysis offers a crucial benefit in terms of the case study approach. Each researcher functions as an independent generator and "testor" of hypotheses and theoretical connections. However, the researchers will be analyzing the same body of data. Thus when differences of interpretation arise, the researchers will be forced to make their biases and interpretive assumptions explicit to each other and to the readers of the project's reports. Campbell's (1975) discussion of the degrees of freedom in case study research assumes that researchers are able to make their biases and assumptions explicit to themselves and to rigorously test these in the course of investigation and analysis. While this must be true to some extent, there is no guarantee or it nor is there any method of training that can insure it. Thus, in addition to the researchers attempting to make their assumptions and tests of these assumptions explicit, it is important to have different researchers (who, in the case of the TBS staff, come from a diversity of research backgrounds) investigating overlapping substantive domains. As the researchers explictily compare their methods of analysis and findings, this reduces the possibility of implict assumptions and tacit theories biasing the analysis.

As to the coding itself, three possible approaches have been considered. The first was to construct some standard, rigid category system and to train researchers or "coders" to fit the data into this system (running "reliability" checks and so forth). It was determined that this approach was not tenable for a number of reasons. First, the use of such a coding system presumes that the categories are explicitly derived from some well-formulated

theory which in turn guided the actual collection of the data. This process is clearly not applicable to interpretive or hypothesis-generating case studies. Furthermore, it has been argued that such coding approaches, while offering the benefits of reliability and quantifiability, do so at the expense of the rich and idiosyncratic detail that make case study research desirable in the first place (see e.g., Delamont & Hamilton, 1976; Mehan, 1981).

A second approach to coding that was considered entailed somewhat broader and less rigidly specified category systems than in the approach discussed above. Once again, however, such an approach presumes a relatively well specified conceptual orientation: a theory which justifies the prior definition of the categories into which the data are to be compressed.

One final problem with both of the approaches reviewed above is that they minimize much of the creative potential of data analysis. To use Doyle's (1983) terms, they transform the coding process into a "procedural" or "routine" task, instead of a "comprehension" task. They presume, in effect, that comprehension has taken place at the stage in which categories for coding are initially developed.

In contrast, the coding process followed in the TBS research assumes that understanding is a product of an on-going interaction between theories and data. One begins with the specification of issues, concepts, and hypotheses and these are progressively "tested" or matched against the data. Data bearing on particular issues are organized and used to generate coherent descriptions. The multiple implications of different hypotheses or theories are examined in light of the available evidence. In these processes concepts are utilized, modified or rejected. This evolutionary development of concepts and frameworks should be explicitly discussed and made clear in the final

products of the research. That is, the categories must be explicitly described and their gradual modification and use accounted for.

At this stage of the TBS, the issues and concepts that guide data analysis are derived in part from preliminary efforts at data analysis and in part from the reviews of literature presented earlier in this report. Indeed, the selection of areas and issues for the development of case studies was the product of these analyses and literature reviews. What is presented below is a set of issues, topics, and concepts abstracted from the reviews of the literature. These are functioning as preliminary coding or organizing concepts for data analysis. It is to be expected that as the analyses proceed these concepts will become more specific, and will be modified. Other concepts and issues will also presumably be suggested during the course of data analysis. A strict account of categories and concepts used in organizing the data will be kept and presented in the written products of the research along with a detailed account of how concepts were tested and modified in the course of data analysis.

Stages of Data Analysis

The stages of analysis described below represent the steps to be undertaken in the course of data analysis.

1. Duplicates of the entire data set are made for each researcher (this has already been done).

2. The researchers develop explicit statements of the aims and goals of the case studies they are undertaking (this has already been done to some extent in that most of the proposed case studies are incorporated into paper proposals for the annual AERA meetings in 1984). These aims and goals may change somewhat over the course of data analysis, but all such changes should be specifically addressed and explained in the final written products.

3. The researchers derive issues and categories from the outlines presented below which can be linked to the aims or goals of the case studies they are writing.

4. The entire corpus of data is read through once, with the researchers making marginal notations and keeping a running log of coding categories relevant to the aims of the case studies as they emerge. These coding categories can then be integrated with the categories derived from the literature review to produce an overall list of organizing categories.

5. The researchers then read through the data once again, marking off sections of the text relevant to the organizing categories. It is to be expected that several categories may be relevant to a single portion of the data. Any modification, integration, or differentiation of the category systems that takes place during this process should be noted and an explanation given.

6. The researchers then cut out sections of the data and organize these sections in terms of the coding categories. Each section should be annotated in such a way that it can be found in a complete set of the data (document number and page number should be sufficient). Where a section is relevant to more than one organizing category, photocopies of it should be made and the section coded under all relevant categories. The aim of cutting out sections from the data is to preserve as much of the original context and detail as possible of the statements or descriptions in the text.

7. The researchers then assemble the evidence bearing on each issue or category used in the analysis and attempt to make decisions on the following points. First, is there a sufficient amount of data to allow the researcher to make some statements about the issue under consideration? No strict operational rules for this decision can be supplied, but the decisions the researchers make should be noted and explained. This process should also be

useful in pinpointing areas where further research efforts are needed. Second, is data on the issue or concept available from different data sources (e.g., stimulated recall and classroom observations)? In other words, can the data be triangulated? The ability to triangulate data bearing on a particular issue should strengthen the analysis.

8. If the decision has been made that data on a given issue or concern is adequate, the researcher then tries to develop a coherent description or discussion of the issues in question.

9. The researcher then attempts to link discussions on the various issues into a coherent argument bearing on the goals or aims of the case study. This constitutes a first draft of the case study itself.

10. The researcher should then re-read a complete set of the data, pointedly searching for evidence which confounds or is inconsistent with the argument the researcher has made in the case study. Conflicting evidence should be noted, and the researcher should either revise the draft of the case study or explain when the conflicting evidence is not compelling enough to warrant revisions.

11. At this stage, the researcher should have both a draft of the case study and a running log of the organizing issues and concepts used in the construction of the study. This log should illustrate the evolution of the researcher's goals, concepts, and assumptions as they have developed during the course of the data analysis.

12. At this point the researchers should read and critique one another's case studies. Although each researcher will have focused on a different aspect of the data, each will have a thorough acquaintance with the complete data set and should be able to critically evaluate the work of their colleagues. These criticisms should be written and closely argued. The

researchers should also respond to the criticisms in writing. These discussions of different interpretations of the data should become part of the discussion in the project's final report.

SUMMARY

SUMMARY OF THE TEACHER BELIEFS STUDY

This report describes a multiple-method study of junior high school teachers' beliefs and classroom behavior. The study focuses on the ways teachers themselves conceptualize the tasks and processes of teaching. The study also emphasizes the study of the context of teaching and teachers' perceptions of and accomodations to contextual influences. Context is defined broadly to include organizational and community influences on teaching, constraints arising from the nature of the students being taught, and constraints originating in the task structures of classroom organization.

By focusing on the question of how teachers' beliefs are shaped and constrained by outside influences, it is hoped that the research will provide insight into the reasons that teachers give for their practice. The indentification of these "reasons" or "beliefs" should provide researchers with information concerning why teachers act as they do, and also about the kinds of arguments or interventions that might prove persuasive in changing or molding teacher practice.

The Teacher Beliefs Study is based on extensive data gathered during the 1982-83 and 1983-84 school years. Eight teachers in three schools were observed, videotaped, and extensively interviewed over a twelve week period. The sample includes two eighth grade mathematics teachers, two eighth grade English teachers, two eighth grade American history teachers, and two seventh grade Texas history teachers. The data set for each teachers consists of:

a) four stimulated recall interviews per teacher;

b) approximately ten videotaped class sessions per teacher gathered over a twelve week period;

c) ten to eleven detailed narrative observation records of six teachers and eighteen to twenty narrative records on two teachers, all gathered over a twelve week period; and

d) four repertory grid interviews per teacher, focusing on their views of teaching, views of students, conceptions of student

misbehavior, and views of administrative and community influences.

Analysis of these data focuses on three major areas:

1) teachers' views and beliefs about students and student misbehavior;

2) teachers' views of administrative and community influences on their teaching; and

3) teachers' beliefs about their classroom goals and the factors affecting the attainment of these goals.

The conceptual framework, design, methodology, and analysis schema for the Teacher Beliefs study are described in this report. The report also contains extensive reviews of research on teachers' beliefs, attributional processes, and decision-making strategies, as well as reviews of research on contextual influences on teachers' actions in the classroom. Various methodological approaches to the study of teacher beliefs are reviewed, and rationales for the selection of methods for the study are provided.

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